NJD 002 154 144

02-8904-11-PA
REV. NO. 0

FINAL DRAFT
PRELIMINARY ASSESSMENT
COOK AND DUNN PAINT CORP.
NEWARK, NEW JERSEY

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8904-11
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

JUNE 19, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

Richard L. Feinberg
RICHARD L. FEINBERG
PROJECT MANAGER

Dennis Foerter
DENNIS FOERTER
SITE MANAGER

REVIEWED/APPROVED BY:

Ronald M Naman
RONALD M. NAMAN
FIT OFFICE MANAGER

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. **Site Name/Alias** Cook and Dunn Paint Corp.

   Street 167 Kossuth Street

   City Newark **State** New Jersey **Zip** 07101

2. **County** Essex **County Code** 013 **Cong. Dist.** 10

3 **EPA ID No.** NJD002154144

4. **Latitude** 40° 43'33"N **Longitude** 74° 08'20"W

   USGS Quad. Elizabeth, New Jersey

5. **Owner** Ridge Equities Company **Tel. No.** Unknown

   Street 443 Ridgewood Avenue

   City Glen Ridge **State** New Jersey **Zip** 07028

6. **Operator** Cook and Dunn Paint Corp. **Tel. No.** (201) 589-5580

   Street 167 Kossuth Street

   City Newark **State** New Jersey **Zip** 07101

7. **Type of Ownership**

   ☒ Private ☐ Federal ☐ State

   ☐ County ☐ Municipal ☐ Unknown ☐ Other ______

8. **Owner/Operator Notification on File**

   ☒ **RCRA 3001** **Date** 8/11/80 ☐ **CERCLA 103c** **Date** ______

   ☐ **None** ☐ **Unknown**

9. **Permit Information**

Permit	Permit No.	Date Issued	Expiration Date	Comments
Sewer Discharge	Unknown	Unknown	Unknown	

10. **Site Status**

    ☐ Active ☐ Inactive ☒ Unknown

11. **Years of Operation** 11/1/32 to Unknown

12. **Identify the types of waste units (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.**

(a) **Waste Management Areas**

Waste Unit No.	Waste Unit Type	Facility Name for Unit
1	Drums	Unknown

(b) **Other Areas of Concern**

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

On September 9, 1986, the NJDEP Division of Waste Management observed paint sludge and pigments in a catch basin at St. Francis Street and Kossuth Street. This sludge/pigment was obviously coming from Cook and Dunn Paint Corp. An investigation was performed by the NJDEP Division of Waste Management on September 30, 1986. During this investigation, a representative from Cook and Dunn said that the material in the catch basin was a result of bags of material being broken during unloading of trucks. The material, which then washed into the storm drain, consisted of titanium oxide, silica, and kaolin clay. It was concluded that no hazardous substances were involved in this incident. However, Cook and Dunn was informed that it was probably in violation of water regulations.

13. **Information available from**

Contact Amy Brochu **Agency** U.S. EPA **Tel. No.** (201) 906-6802

Preparer Dennis Foerter **Agency** NUS Corp. Region 2 FIT **Date** June 7, 1989

PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following six items.

Waste Unit 1 - Drums, Unknown

1. **Identify the RCRA status and permit history, if applicable, and the age of the waste unit.**

   Cook and Dunn Paint Corp. was listed as a treatment, storage or disposal facility on August 11, 1980. The facility was delisted and granted generator-only status on March 3, 1983. The wastes in these drums are removed within 90 days. There are no known permit violations pertaining to this waste unit.

2. **Describe the location of the waste unit and identify clearly on the site map.**

   The location of the drum storage area is unknown.

3. **Identify the size or quantity of the waste unit (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums or tanks). Specify the quantity of hazardous substances in the waste unit.**

   A RCRA generator inspection performed by the NJDEP on June 23, 1982 found six drums stored on site.

4. **Identify the physical state(s) of the waste type(s) as disposed of in the waste unit. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid, or gas.**

   Liquid.

5. **Identify specific hazardous substance(s) known or suspected to be present in the waste unit.**

   Wastes stored in drums consist of mineral spirits and waste solvent. Propylene glycol and phenyl mercuric acetate may also be stored in drums.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   A RCRA generator inspection performed by the NJDEP on June 23, 1982 found that the drum storage was secure.

Ref. Nos. 1, 2, 3, 4

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

   The potential for release of contaminants to groundwater is minimal. Wastes are stored in a secure indoor facility for less than 90 days.

   Ref. Nos. 3, 4, 5

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

   The aquifer of concern is the Newark Group Brunswick Shale. Most wells are tapped into the extremely fractured upper portion of the aquifer, which is under modified water table conditions. That is, water is generally free to move in any direction and seek the level determined by the factors affecting recharge and discharge. In the area of the site the Brunswick Formation is at a depth of approximately 90 feet; however, its exact thickness is not known. It may be as thick as 5000 feet. The unconsolidated zone between the surface and the bedrock is composed of Pleistocene deposits. The deposits overlie the Brunswick Shale throughout practically all of the Newark area. These deposits consist of unconsolidated till and stratified glacial drift. The till is an unstratified, heterogeneous mixture of clay, boulders, and sand. The drift is composed of sand and gravel. In the area of the site the Pleistocene deposits are approximately 90 feet thick. Most of these deposits have a high porosity and permeability. The water table in this area of Newark is less than 20 feet below ground surface. Because most of the wells in the area are tapped into the extremely fractured upper portion of the Brunswick Shale, the Brunswick Shale will be evaluated as an unconfined aquifer. The Pleistocene deposits are hydraulically connected to the Brunswick Shale.

   Ref. Nos. 6, pp. 1-29; 7; 8; 9

3. **Is a designated sole source aquifer within 3 miles of the site?**

   There are no sole source aquifers within 3 miles of the site.

   Ref. No. 10

4. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

   The lowest point of waste disposal is assumed to be ground surface. The highest seasonal level of the saturated zone is less than 20 feet below ground surface.

   Ref. Nos. 5, 7, 8

5. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the aquifer of concern?**

   The least permeable intervening stratum between the ground surface and the aquifer of concern is unconsolidated till. Its permeability value is approximately 10^{-3} - 10^{-5} cm/sec.

   Ref. Nos. 6, pp. 1-29; 11

6. **What is the net precipitation for the area?**

   Approximately 13 inches.

   Ref. No. 11

7. **Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).**

   Groundwater within 3 miles of the site is only used for industrial purposes.

   Ref. Nos. 6, pp. 1-29; 12; 13

8. What is the distance to and depth of the nearest well that is currently used for drinking or irrigation purposes?

Distance N/A **Depth** N/A

9. Identify the population served by the aquifer of concern within a 3-mile radius of the site.

The population served by the aquifer of concern within a 3-mile radius of the site is zero.

Ref. Nos. 12, 13

SURFACE WATER ROUTE

10. Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.

There is a potential for contaminants to reach surface water, if contaminants migrate to storm drains. Reportedly, there is a catch basin on the corner of St. Francis and Kossuth Avenues. However, it is difficult to determine the locations to which the storm drains lead.

Ref. Nos. 14, 24

11. Identify and locate the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.

The nearest downslope surface water is the Passaic River, which is located approximately 0.8 mile north of the site. The Passaic River flows into the Newark Bay approximately 1.2 miles south of where contaminants can possibly enter the Passaic River.

Ref. No. 14

12. What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)

The facility slope is less than 1 percent.

Ref. No. 5

13. What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water.)

The slope of intervening terrain is less than 1 percent.

Ref. No. 14

14. What is the 1-year 24-hour rainfall?

Approximately 2.75 inches.

Ref. No. 11

15. What is the distance to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.

The nearest downslope surface water is the Passaic River, which is located approximately 0.8 mile north of the site.

Ref. No. 14

16. Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).

The Passaic River has no apparent use in the Newark area. The Newark Bay is only used for industrial and municipal disposal, and as a secondary recreational source.

Ref. Nos. 15, 18

17. **Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.**

There is a coastal wetland approximately 1.2 miles downstream of where contaminants might be expected to enter the Passaic River.

Ref. Nos. 14, 22

18. **Describe any critical habitats of federally listed endangered species within 2 miles of the site along the migration path.**

There are no critical habitats within 2 miles of the site.

Ref. No. 17

19. **What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?**

Wetlands are found approximately 1.2 miles south of where contaminants might be expected to enter the Passaic River.

Ref. Nos. 14, 22

20. **Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).**

There are no known intakes within 3 miles downstream of the site.

Ref. Nos. 15, 16

21. **What is the state water quality classification of the water body of concern?**

The state water quality classification for the Passaic River and the Newark Bay is SE3.

Ref. No. 18

22. **Describe any apparent biota contamination that is attributable to the site.**

No known biota contamination exists.

Ref. No. 5

AIR ROUTE

23. Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.

There is little potential for release of contaminants to the air due to the fact that wastes are stored indoors in secure containers.

Ref. No. 4

24. **What is the population within a 4-mile radius of the site?**

Approximately 465,500 people live within a 4-mile radius of the site.

Ref. No. 19

FIRE AND EXPLOSION

25. **Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.**

There is little potential for fire or explosion to occur as the substances stored on site are well contained.

Ref. No. 4

26. **What is the population within a 2-mile radius of the hazardous substance(s) at the facility?**

Approximately 60,300 people live within a 2-mile radius of the site.

Ref. No. 19

DIRECT CONTACT/ON-SITE EXPOSURE

27. **Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.**

There is little potential for direct contact with hazardous substances because wastes are reported to be secure.

Ref. Nos. 4, 5

28. **How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?**

There are no residences bordering any part of the site. However, there are residences located 1 block northwest of the site. There is also a park across St. Charles Street.

Ref. No. 5

29. **What is the population within a 1-mile radius of the site?**

Approximately 21,000 people live within a 1-mile radius of the site.

Ref. No. 19

PART IV: SITE SUMMARY AND RECOMMENDATIONS

Cook and Dunn Paint Corp. is a site located in an industrial area of Newark, Essex County, New Jersey. The property is owned by Ridge Equities Company and is located on 167 Kossuth Street. In the past, the company was involved in the manufacture of paint. The active period of this operation is unknown.

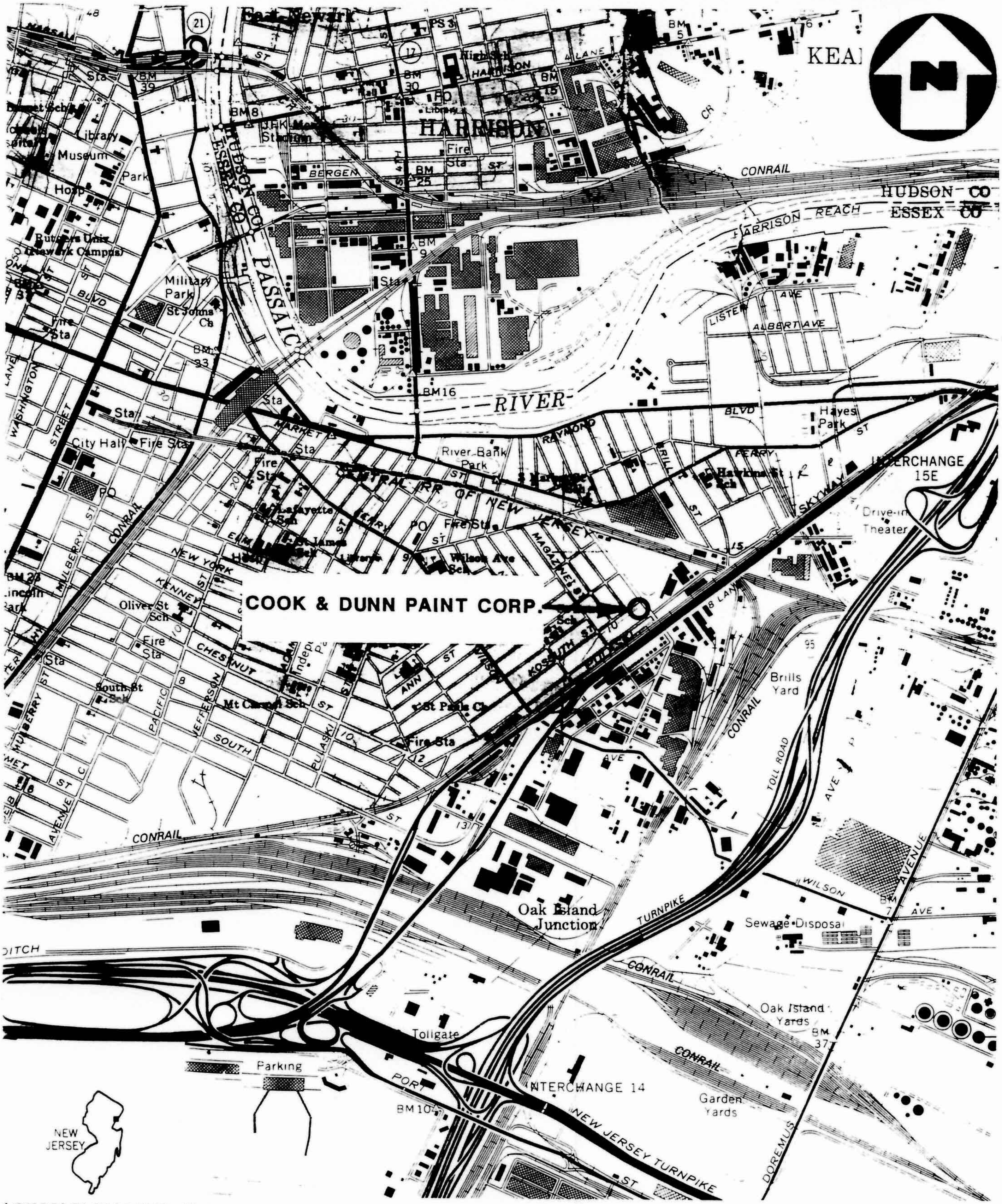
It is not known whether the site is presently active. The site appeared to be vacant, according to an off-site reconnaissance performed by FIT on April 20, 1989. There was a sign posted on the side of the building indicating that the space was available. However, Cook and Dunn Paint Corp. signs still exist throughout the site.

Cook and Dunn Paint Corp. was listed as a treatment, storage, or disposal facility on August 11, 1980. The company was delisted and granted generator-only status on March 3, 1983. The only hazardous waste at the facility was stored in drums. A RCRA generator inspection performed by the NJDEP on June 23, 1982 found six drums stored on site and reported these drums to be secure. The location of the drums is unknown. The liquid wastes in these drums contained mineral spirits and waste solvent. Phenyl mercuric acetate and propylene glycol may also have been stored in drums. These wastes were believed to be nonhazardous due to their dilution ratio. All of these wastes were generated from either cleaning or washing down of tanks and mixers. Also, wastewater from latex tanks was discharged to the Passaic Valley Sewer Commission by permit.

Since wastes stored were well contained and there is no potential for direct contact, and because the wastes were believed to be nonhazardous due to their dilution ratio, **NO FURTHER REMEDIAL ACTION PLANNED (NFRAP)** is recommended.

ATTACHMENT A

MAPS AND PHOTOS



(QUAD) ELIZABETH, N.J.

FIGURE 1

SITE LOCATION MAP

COOK & DUNN PAINT CORP., NEWARK, N.J.

SCALE: 1" = 2000'

NUS CORPORATION

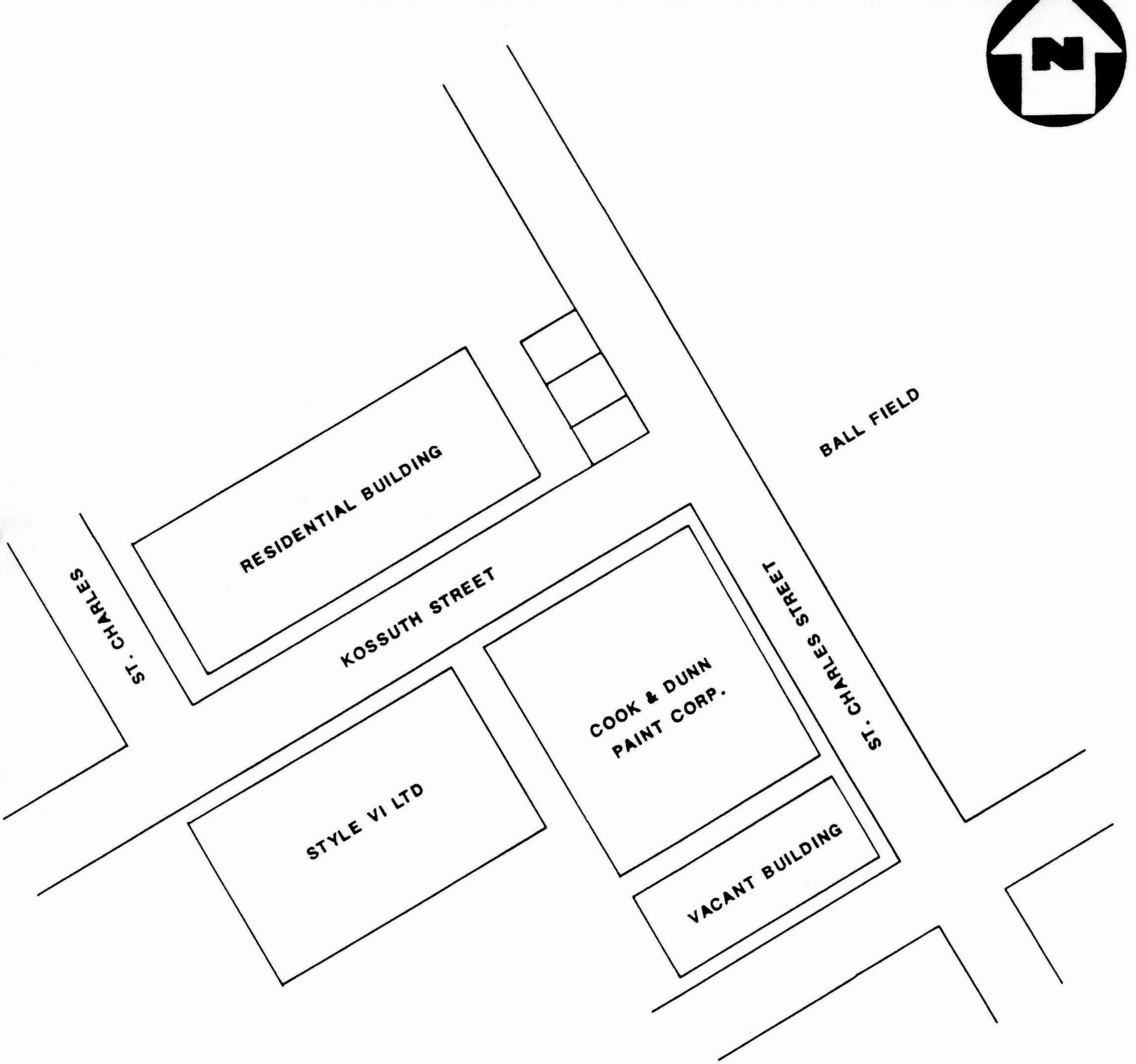


FIGURE 2

SITE MAP
COOK & DUNN PAINT CORP.,
NEWARK, N.J.
(NOT TO SCALE)

NUS CORPORATION

EXHIBIT A

PHOTOGRAPH LOG

COOK AND DUNN PAINT CORP.
NEWARK, NEW JERSEY

APRIL 20, 1989

COOK AND DUNN PAINT CORP.
NEWARK, NEW JERSEY
APRIL 20, 1989

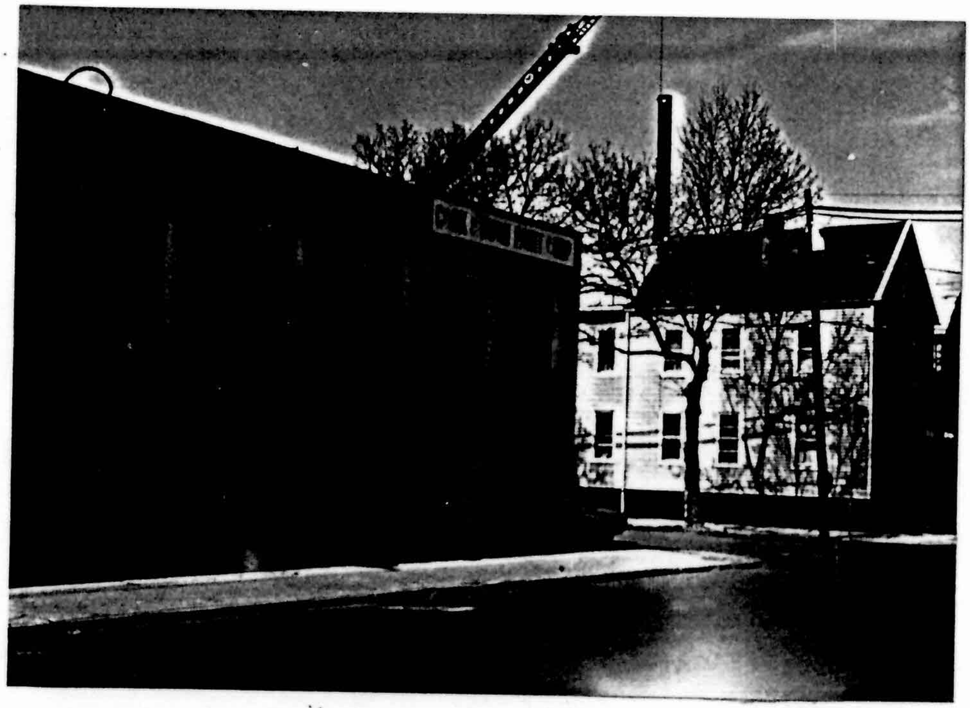
PHOTOGRAPH INDEX

ALL PHOTOGRAPHS TAKEN BY JOHN HARRISON

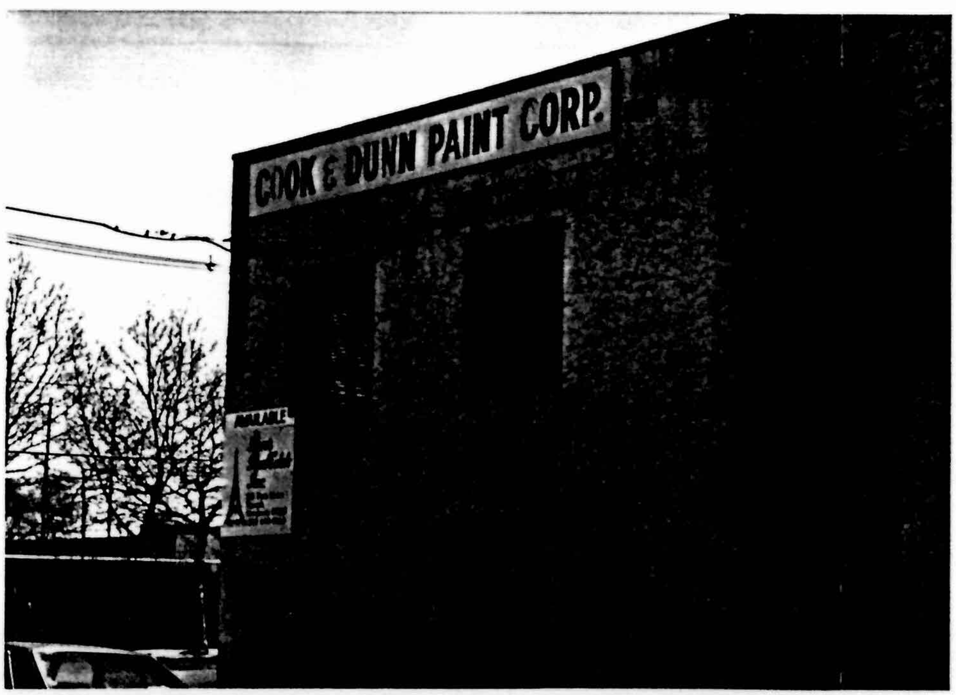
Photo number	Description	Time
2P-17	View of building from St. Charles Street; looking at houses.	1217
2P-18	View of building from Kossuth Street.	1220
2P-19	View of entire side of building from Kossuth Street.	1222

02-8904-11-PA
Rev. No. 0

COOK AND DUNN CORP.
NEWARK, NEW JERSEY

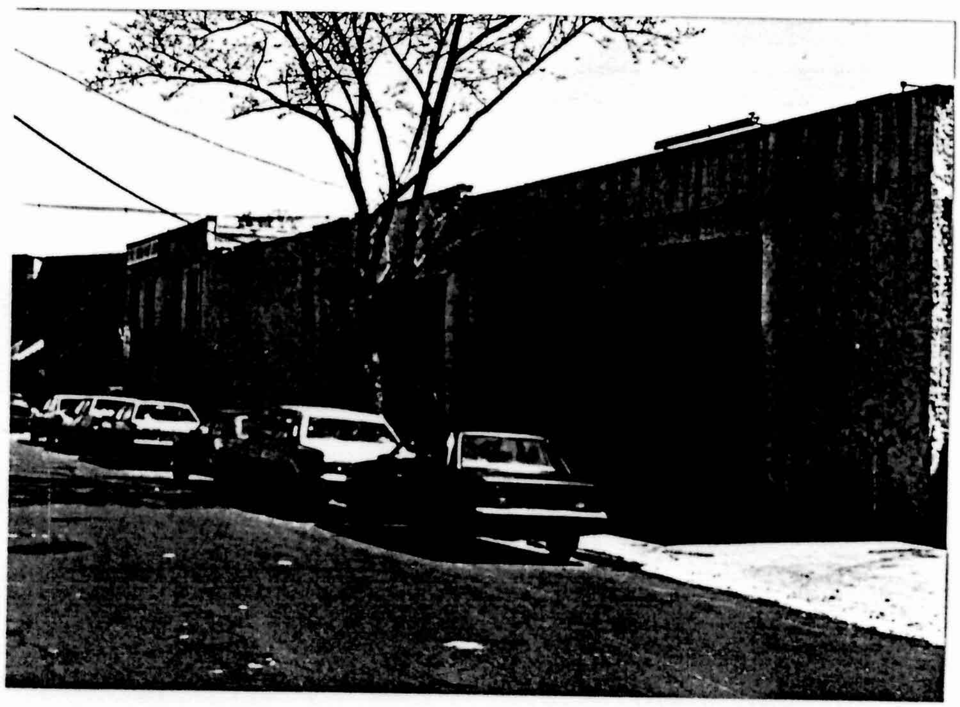


2P-17 April 20, 1989 1217
View of building from St. Charles Street; looking at houses.



2P-18 April 20, 1989 1220
View of building from Kossuth Street.

COOK AND DUNN PAINT CORP.
NEWARK, NEW JERSEY



2P-19 April 20, 1989 1222
View of entire side of building from Kossuth Street.

ATTACHMENT B

REFERENCES

REFERENCES

1. Incident Notification Report, NJDEP, Division of Waste Management, September 9, 1986.

2. Investigation, NJDEP, Division of Waste Management, September 30, 1986.

3. Letter from Frank Coolick, Chief, Bureau of Hazardous Waste Engineering, to Cook and Dunn Paint Corp., March 3, 1983.

4. RCRA Generator Inspection Form, NJDEP, June 23, 1982.

5. Off-Site Reconnaissance Information Reporting Form, NUS Corporation Region 2 FIT, April 20, 1989.

6. Herpers, H., and Barksdale H.L. Preliminary Report on the Geology and Groundwater Supply of the Newark, New Jersey, area. Special Report 10. State of New Jersey Department of Conservation and Economic Development, Divison of Water Policy and Supply, 1951.

7. Department of Environmental Protection, Well Record, Scientific Chemical Co., March 6, 1980.

8. Report of soil boring and soils engineering for site at 257 Wilson Avenue, Newark, New Jersey for J. Marzano and Sons, Inc. Project 83-116/50-1999, Report No. 194. Technical Testing Inc. August 8, 1983.

9. U.S. Department of the Interior, Bedrock Topography and Thickness of Pleistocene Deposits in Union County areas, New Jersey, 1974, Bronius Nemickas.

10. Passaic River Coalition. The Buried Valley Aquifer Systems: Resources and contamination, 1986.

11. Uncontrolled hazardous waste site ranking system, A user's manual, 40 CFR, Part 300. Appendix A, 1986.

12. Telecon Note: Conversation between Ms. James, Newark City Water Department, and David Heim, NUS Corp., February 27, 1989.

13. Telecon Note: Conversation between Mr. Melito, Engineer, Essex County Department of Public Works, and Richard Pagano, NUS Corp., January 20, 1988.

14. Three-Mile Vicinity Map based on U.S. Department of the Interior, Geological Survey Topographic Map, 7.5 minute series, "Elizabeth Quadrangle", 1967, revised 1981.

15. Telecon Note: Conversation between Anthony Debarros, Newark City Water Department, and Dennis Foerter, NUS Corp., April 25, 1989.

16. Suszkowski, Dennis. Sedimontology of Newark Bay, New Jersey: an urban estuarine bay, 1978.

17. Atlantic Coast Ecological Inventory, U.S. Fish and Wildlife Service, 1980.

18. NJDEP, Division of Water Resources, Surface Water Quality Standards, May 1985.

REFERENCES (CONT'D)

19. General Sciences Corporation, Graphical Exposure Modeling Systems (GEMS), Landover, Maryland, 1986.

20. Telecon Note: Conversation between Bob Shaffery, Newark Surveyor's Office, and Dennis Foerter, NUS Corp., June 6, 1989.

21. Sax, N.I. Dangerous properties of industrial materials, 5th ed. New York, Van Nostrand Reinhold Co., 1979.

22. U.S. Department of the Interior, Atlas of National Wetlands Inventory Map for New Jersey, February 1984.

23. HWDMS Master Facility Listing., Cook & Dunn Paint Corp., September 20, 1982.

24. Telecon Note: Conversation between Mr. Alvi, City of Newark, Engineering Department, and Dennis Foerter, NUS Corp., June 9, 1989.

REFERENCE NO. 1

Form VSC-005
4/85

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

7-14-99

INCIDENT NOTIFICATION REPORT

☐ TRENTON DISPATCH ☒ DIV. OF WASTE MANAGEMENT ☐ DIV. OF ENVIR. QUALITY ☐ DIV. OF WATER RESOURCES

☐ HQ FIELD OFFICE: ☐ NORTHERN ☒ METRO ☐ CENTRAL ☐ SOUTHERN

DATE 09-19-86 TIME (Military) 1330 REC'D BY Pastock PHONE NO. 669-3960

INCIDENT REPORTED BY: CASE NO. 86.09.19.0HM

NAME Jack Farley PHONE 675-1774

STREET

CITY STATE

AFFILIATION Sub. Regional

NATURE OF INCIDENT:

EMERGENCY: ☐ FIRE ☐ EXPLOSION ☐ DRUMS ☒ SPILL ☐ DERAILMENT ☐ MVA

COMPLAINT: ☐ SMOKE ☐ ODORS ☐ DUST ☐ SEWAGE ☐ NUISANCE ☐ ILLEGAL DUMPING

OTHER: ☐

INCIDENT LOCATION:

NAME (Site) COOK & DUNN PAINTS ☐ UNK PHONE

STREET 115 St. FRANCIS St.

CITY NEWARK COUNTY ESSEX STATE ZIP CODE

STATUS AT SCENE OF INCIDENT: OBSERVED paint sludge & pigments in catch basin at St. Francis Street and Kossuth St.

DATE OF INCIDENT: 09-19-86 TIME: 1330

ANYONE HOSPITALIZED ☐ YES ☒ NO POLICE AT SCENE ☐ YES ☒ NO

AREA EVACUATED ☐ YES ☒ NO FIREMAN AT SCENE ☐ YES ☒ NO

CONTAMINATION OF ☐ AIR ☒ LAND ☐ WATER ASSISTANCE REQUIRED ☐ YES ☒ NO

PUBLIC EXPOSURE ☐ YES ☒ NO

RECEIVING WATER POTABLE WATER SOURCE ☐ YES ☐ NO

WIND DIRECTION LOCATION TYPE ☐ CITY ☐ INDUSTRIAL ☐ RURAL

SOURCE OF INCIDENT/PROBLEM: ☒ KNOWN ☐ UNKNOWN

COMPANY NAME ABOVE PHONE

CONTACT TITLE

STREET

CITY COUNTY STATE ZIP CODE

IDENTITY OF SPILLED AND/OR DISCHARGED SUBSTANCE: ☒ KNOWN ☐ UNKNOWN

NAME OF SUBSTANCE PAINT PIGMENTS & SLUDGE

AMT. Unk. A/P/E SUBSTANCE CONTAINED ☐ YES ☐ NO ☐ UNKNOWN

OFFICIALS NOTIFIED: (A-310)

HEALTH DEPT.: PERSON they called us. PHONE DATE

LOCAL MUNIC.: PERSON PHONE DATE

INCIDENT REFERRED TO: ☐ BFO ☐ BERC ☐ DCJ ☐ DWR ☐ F&G ☐ BAPC ☐ HD

1. PERSON Freeman 9/30/86 PR PHONE DATE

2. PERSON PHONE DATE

COMMENTS: NFA 10/1/86 PR

JACK Said the paint sludge/pigment is obviously coming from COOK & DUNN.

COPIES: White - File Yellow - Trenton Dispatch Pink - DWM Enforcement

REFERENCE NO. 2

Form DWM-051
10/85

NEW JER... DEPARTMENT OF ENVIRONMENTAL PROTEC...
DIVISION OF WASTE MANAGEMENT

Page ____ of ____

INVESTIGATION

CASE #: 86-09-19-04

DWM FILE #: - -

TIME ARRIVED: 1300

INVESTIGATOR: David Beeman

DATE: 9-30-86

TIME DEPARTED: 1330

LOCATION: Cook & Dunn Paints

PROPERTY OWNER:

ADDRESS: 115 St. Francis St
Newark

MAILING ADDRESS:

LOCATION TELEPHONE #:

BLOCK:

LOT:

EPA ID #:

LOCAL HEALTH DEPT. REP.

TELEPHONE #:

ORIGIN OF COMPLAINT:

TELEPHONE #:

NATURE OF COMPLAINT:

PHOTOGRAPHS TAKEN:

SAMPLE #:

FINDINGS: Observed thick white material going into a catch basin on corner of St Francis and Kossuth St. Spoke to Mr Hanlon of Cook & Dunn. He showed me bags of material which he said was the substance - These were TiO_2, Silica, and Kaolin Clay. He stated that sometimes bags break while unloading trucks and they wash in to the storm drain. I told him he was probably in violation of water regulations.

Conclusions: No hazardous substance involved, refer to DWR

D. Beeman

10/1/86

COPIES ... White - DWM File ... Yellow - Local Health Dept. ... Pink - ...

REFERENCE NO. 3

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
32 E. Hanover St., CN 027, Trenton, N.J. 08625

JACK STANTON
DIRECTOR

LINO F. PEREIRA
DEPUTY DIRECTOR

03 MAR 1983

Cook & Dunn Paint Corp
167 Kossuth Street
Newark, NJ 07101

RE: Facility Operating Status

Dear Sir:

The Bureau of Hazardous Waste Engineering has reviewed your company's response to the Notice of Violation, Failure to Submit Annual Report. The Bureau finds that the response contains adequate information to determine the operating status of this facility with respect to N.J.A.C. 7:26-1 et seq., the New Jersey Hazardous Waste Management Regulations. The Bureau has determined that the company's hazardous waste treatment, storage or disposal facility as delineated in the company's RCRA Part A application and identified by the following EPA ID Number:

EPA ID NO. NJD002154144

has been excluded from regulations under N.J.A.C. 7:26-1.1 et seq. because your facility accumulates hazardous waste on-site for less than 90 days. This exclusion classifies your facility solely as a generator provided the following conditions are complied with:

1. All such waste is, within 90 days or less, shipped off-site to an authorized facility or placed in an on-site authorized facility, as defined at N.J.A.C. 7:26-1.4.

2. The waste is placed in containers which meet the standards of N.J.A.C. 7:26-7.2 and are managed in accordance with N.J.A.C. 7:26-9.4(d).

3. The date upon which each period of accumulation begins is clearly marked and visible for inspection on each container.

4. The generator complies with the requirements for owners and operators of N.J.A.C. 7:26-9.6 and 9.7 concerning preparedness and prevention, contingency plans and emergency procedures as well as N.J.A.C. 7:26-9.4(g) concerning personnel training.

5. For bulk accumulation of dry hazardous waste materials, the waste pile is managed according to the following:

   (i) The waste pile is no larger than 200 cubic yards; and

   (ii) The pile shall be placed on an impermeable base that is compatible with the waste; and

   (iii) Run-on shall be diverted away from the pile; and

   (iv) Any leachate and run-off from the pile must be collected and managed as a hazardous waste.

This written acknowledgement of the exclusion of the above identified facility from N.J.A.C. 7:26-1 _et seq_. is based expressly on the review of the aforementioned correspondence. This letter makes no claim as to the extent and physical condition of the actual hazardous waste activities occuring at the site mentioned above.

Your company's hazardous waste facility above is no longer included in DEP's list of "existing facilities" (see N.J.A.C. 7:26-1.4 and 12.3) and therefore does not need to conform with the interim operating requirments of N.J.A.C. 7:26-1 _et seq_. for "existing facilities" which would include the TSD facility annual report. It is the company's responsibility to operate within the conditions listed above. To operate a hazardous waste facility without prior approval from the DEP is a violation of the Solid Waste Management Act N.J.S.A. 13:1E-1 _et seq_.

As a result of the conclusions previously made, the Notice of Violation entitled "Failure to Submit Annual Report" signed by Mr. David Shotwell is rescinded and need not be complied with.

If you have any questions on this matter, please call my office at (609) 292-9880.

Very truly yours,

Frank Coolick

Frank Coolick, Chief
Bureau of Hazardous Waste Engineering

FC:jb

cc Dave Shotwell
NJDEP, Division of Waste Management

Tom Taccone
USEPA, Region II

REFERENCE NO. 4

RCRA GENERATOR INSPECTION FORM

COMPANY NAME: Cook & Dunn

EPA I.D. NUMBER: NJD002154144

COMPANY ADDRESS: 167 Kossuth St
Newark NJ

COMPANY CONTACT OR OFFICIAL: Mr Rudy Koff

INSPECTOR'S NAME: Mike Nalbone

TITLE: Technical Director

BRANCH/ORGANIZATION: N.J.D.E.P.

CHECK IF FACILITY IS ALSO A TSD FACILITY: X

DATE OF INSPECTION: 6/23/82

	YES	NO	DON'T KNOW
(1) Is there reason to believe that the facility has hazardous waste on site?	X		

a. If yes, what leads you to believe it is hazardous waste? Check appropriate box:

[X] Company admits that its waste is hazardous during the inspection.

[X] Company admitted the waste is hazardous in its RCRA notification and/or Part A Permit Application.

[ ] The waste material is listed in the regulations as a hazardous waste from a nonspecific source (§261.31)

[X] The waste material is listed in the regulations as a hazardous waste from a specific source (§261.32)

[ ] The material or product is listed in the regulations as a discarded commercial chemical product (§261.33)

[ ] EPA testing has shown characteristics of ignitability, corrosivity, reactivity or extraction procedure toxicity, or has revealed hazardous constituents (please attach analysis report)

[ ] Company is unsure but there is reason to believe that waste materials are hazardous. (Explain)

	YES	NO	DON'T KNOW
b. Is there reason to believe that there are hazardous wastes on-site which the company claims are merely products or raw materials?	__	X	__

Please explain:

c. Identify the hazardous wastes that are on-site, and estimate approximate quantities of each.

WASTE Solvent and MINERAL SPIRITS - stored on site are 6 drums (55 gallon eac
waste water from latex Tanks - material is disposed of down PVSA sewer by permi
Phenyl mercury acetate - material used in paint
propolene glycol - also used in paint manufacturing

d. Describe the activities that result in the generation of hazardous waste.

All materials above are generated from either cleaning or washing down of tanks or mixers.

	YES	NO	DON'T KNOW
(2) Is hazardous waste stored on site?	X	__	__

a. What is the longest period that it has been accumulated?

over 1 year

	YES	NO	DON'T KNOW
b. Is the date when drums were placed in storage marked on each drum?	__	X	__
(3) Has hazardous waste been shipped from this facility since November 19, 1980?	__	X	__

a. If "yes," approximately how many shipments were made?

(4) Approximately how many hazardous waste shipments off site have been made since November 19, 1980?

	YES	NO	DON'T KNOW
a. Does it appear from the available information that there is a manifest copy available for each hazardous waste shipment that has been made?	__	__	N/A

b. If "no" or "don't know," please elaborate.

	YES	NO	DON'T KNOW
c. Does each manifest (or a representative sample) have the following information?			
– a manifest document number	___	___	___
– the generator's name, mailing address, telephone number, and EPA identification number	___	___	___
– the name, and EPA identification number of each transporter	___	___	___
– the name, address and EPA identification number of the designated facility and an alternate facility, if any:	___	___	___
– a description of the wastes (DOT)	___	___	___
– the total quantity of each hazardous waste by units of weight or volume, and the type and number of containers as loaded into or onto the transport vehicle	___	___	___
– a certification that the materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation under regulations of the Department of Transportation and the EPA	___	___	___
(5) Were there any hazardous wastes stored on site at the time of the inspection?	X	___	___
a. If "yes," do they appear properly packaged (if in containers) or, if in tanks, are the tanks secure?	X	___	___
b. If not properly packaged or in secure tanks, please explain.	X		
c. Are containers clearly marked and labelled?	___	X	___
d. Do any containers appear to be leaking?	___	X	___
e. If "yes," approximately how many?			

*(6) Has the generator submitted an annual report to EPA covering the previous calendar year? N/A

a. How do you know?

(7) Has the generator received signed copies (from the TSD facility) of all manifests for wastes shipped off site more than 35 days ago? N/A

a. If "no," have Exception Reports been submitted to EPA covering these shipments?

(8) General comments. The company is unsure of some of the waste as being designated as hazardous. One waste paint containing phenyl mercury acetate (P09[illegible] which is on the toxic List is not considered hazardous because of the dilution. Usually an 8 oz bag per 400 gallons is the mixture ratio for phenyl mercury aceta[illegible] to paint. The second waste not designated as hazar[illegible] by the company is propylene glycol (P100). I am recommending that a letter be sent to the comp[illegible]any informing them of the hazard involved.

Also the company informed me that the pai[illegible] Manufacturing Organization declassified (K078) (K079) (K08[illegible] Is it correct in assuming this was done also b[illegible] EPA.

*The effective date for this requirement is March 1, 1982.

REFERENCE NO. 5

PRELIMINARY ASSESSMENT
OFF SITE RECONNAISSANCE
INFORMATION REPORTING FORM

Date: 4-20-89

Site Name: Cook & Dunn Paint Corp. TDD: 02-8904-11

Site Address: 167 Kossuth St.
Street, Box, etc.

Newark
Town

Essex
County

NJ
State

NUS Personnel:

Name	Discipline
JOHN HARRISON	FIELD TECHNICIAN
ED KNYFD	GEOLOGIST

Weather Conditions (clear, cloudy, rain, snow, etc.):

Clear

Estimated wind direction and wind speed: 5-10 mph south

Estimated temperature: 55°

Signature: Date:

Countersigned: Date: 4/20/89

PRELIMINARY ASSESSMENT

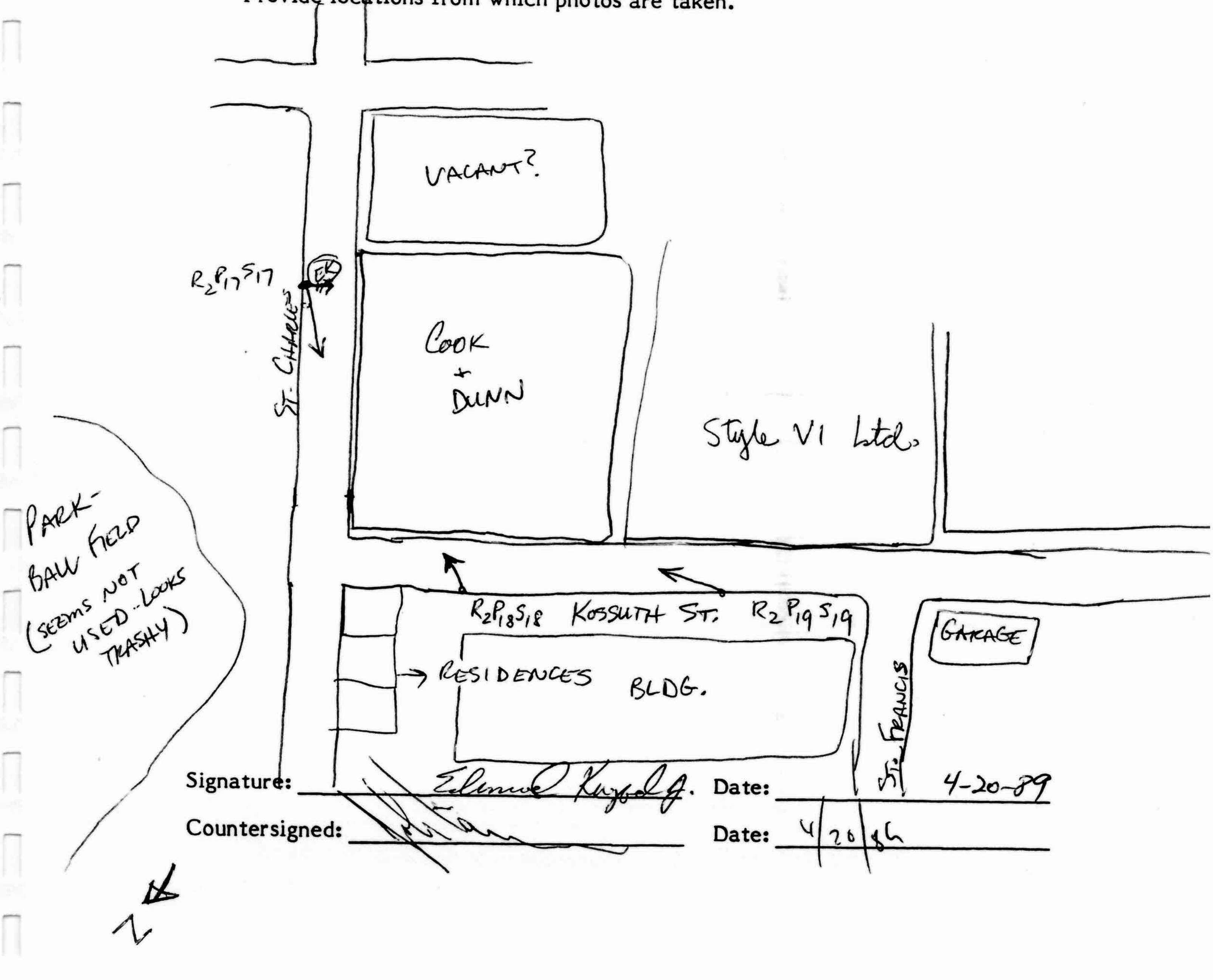
INFORMATION REPORTING FORM

Date: 4-20-89

Site Name: Cook & Dunn Paint Corp.   TDD: 02-8904-11

Site Sketch:

Indicate relative landmark locations (streets, buildings, streams, etc.).
Provide locations from which photos are taken.



Signature: Edmund Kaygold Jr.   Date: 4-20-89

Countersigned: [signature]   Date: 4/20/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 4-20-89

Site Name: Cook & Dunn Paint Corp. TDD: 02-8904-11

Notes (Periodically indicate time of entries in military time):

Arrived on site at 1212. Noticed a "Paris Real Estate" sign on the building. Building and or this business appears to be vacant. ~~and~~ No waste storage of any type noticed. No activity on site noticed. No catch basins noted at the intersection of Kossuth and St. Francis streets. left site at 1227.

Signature: Edmund Kopf Date: 4-20-89

Countersignature: [signature] Date: 4/20/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 4/20/89

Site Name: ____________ TDD: ____________

Notes (Cont'd):

Attach additional sheets if necessary. Provide site name, TDD number, signature, and countersignature on each.

Signature: Edmund Kozel Jr. Date: 4-20-89

Countersignature: [illegible] Date: 4/20/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 4-20-89

Site Name: Cook & Dunn Paint Corp. TDD: 02-8904-11

Photolog:

Frame/Photo Number	Date	Time	Photographer	Description
$R_2 P_{17} S_{17}$	4-20-89	1217	JOHN	View of bldg from St. Charles street looking at houses
$R_2 P_{18} S_{18}$	4-20-89	1220	JOHN	View of bldg from Kossuth street
$R_2 P_{19} S_{19}$	4-20-89	1222	JOHN	View of whole side of bldg from Kossuth Street.

Attach additional sheets if necessary. Provide site name, TDD number, signature, and countersignature on each.

Signature: [illegible] Date: 4-20-89

Countersignature: [illegible] Date: 4/20/89

REFERENCE NO. 6

STATE OF NEW JERSEY

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT

CHARLES R. ERDMAN, JR., COMMISSIONER

DIVISION OF WATER POLICY AND SUPPLY

HOWARD T. CRITCHLOW, DIRECTOR AND CHIEF ENGINEER

SPECIAL REPORT 10

PRELIMINARY REPORT ON THE GEOLOGY AND GROUND-WATER SUPPLY OF THE NEWARK, NEW JERSEY, AREA

By

Henry Herpers

and

Henry C. Barksdale

1951

Prepared in cooperation with the
United States Department of the Interior
Geological Survey

LETTER OF TRANSMITTAL

Honorable Charles R. Erdman, Jr., Commissioner
Dept. of Conservation & Economic Development

Dear Sir:

I am transmitting herewith a report on the ground water supplies of the Newark, New Jersey, area prepared by Henry Herpers of the State Geologic & Topographic Survey, and Henry C. Barksdale, District Engineer of the United States Geological Survey. This report has been prepared in cooperation with the United States Geological Survey as a part of the cooperative investigation of the ground water resources of the State.

The report describes the geology and ground water conditions in the City of Newark and its vicinity. It defines the limits of a gravel-filled preglacial channel, the existence of which has only been inferred heretofore. It describes the critical lowering of the water levels in the eastern part of Newark, and the rather general intrusion of salt water into the water-bearing formations in that area. The report points out that the safe yield of the water-bearing formations in parts of the area may have been exceeded, and that further large developments in other parts of the area should be made with great caution, if at all.

I, therefore, recommend that this report be published as a Special Report of the Division of Water Policy & Supply, in order that the information contained therein may be made available to the people of the State.

Respectfully submitted,

H. T. CRITCHLOW
Director & Chief Engineer

Encl.

October 22, 1951

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLY
520 EAST STATE STREET, TRENTON 9, N. J.

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Howard T. Critchlow, *Director and Chief Engineer*

Charles R. Erdman, Jr., *Commissioner of Conservation and Economic Development*

CONTENTS

ILLUSTRATIONS

PRELIMINARY REPORT ON THE GEOLOGY AND GROUND WATER SUPPLY OF THE NEWARK, NEW JERSEY, AREA

By Henry Herpers and Henry C. Barksdale

ABSTRACT

In the Newark area, ground water is used chiefly for industrial cooling, air-conditioning, general processing, and for sanitary purposes. A small amount is used in the manufacture of beverages. Total ground-water pumpage in Newark is estimated at not less than 20,000,000 gallons daily.

The Newark area is underlain by formations of Recent, Pleistocene and Triassic age, and the geology and hydrologic properties of these formations are discussed. Attention is called to the important influence of a buried valley in the rock floor beneath the Newark area on the yield of wells located within it. Data on the fluctuation of the water levels and the variation in pumpage are presented, and their significance discussed. The results of a pumping test made during the investigation were inconclusive. The beneficial results of artificially recharging the aquifers in one part of the area are described.

The intrusion of salt water into certain parts of the ground-water body is described and graphically portrayed by a map showing the chloride concentration of the ground water in various parts of the City. Insofar as available data permit, the chemical quality of the ground water is discussed and records are given of the ground-water temperatures in various parts of the City.

There has been marked lowering of the water table in the eastern part of the area, accompanied by salt water intrusion, indicating that the safe yield of the formations in this part of Newark has probably been exceeded. It is recommended that the study of the ground water res[illegible]es of this area be continued, and that artificial re[illegible]ing of the aquifers be incre[illegible] as wide[illegible] a[illegible]ossible.

INTRODUCTION

Purpose and scope of investigation

In the Newark area, the chief uses of ground water are for cooling by industries, for air-conditioning, and for general processing and sanitary purposes. Several beverage manufacturers use ground water as an ingredient in their products, and the water from a few wells is used for drinking. As one result of a recently completed survey of all known wells, it is estimated that not less than 20 million gallons of ground water is used in this area per day. In summer an estimated one to one and a half million gallons of ground water is used for air-conditioning alone.

Records kept by various well owners and by State and Federal agencies have shown a marked lowering of the water level in many Newark wells, as well as a diminution in the yield of some. They have also shown that the ground water in certain parts of the area has become brackish because of heavy pumpage and the infiltration of salt water from surface sources. These conditions are particularly severe in the eastern part of Newark in what is known locally as the "Ironbound District." In order to give some conception of the seriousness of these conditions, it may be mentioned that in the year 1879 the water level in wells in eastern Newark ranged from a few feet above to 25 feet below the surface of the ground, and several 8-inch wells yielded as much as 500 gallons per minute when pumped by direct suction. Analyses of the water from these wells showed that it contained only 10 to 25 parts per million of chloride.[1]

[1] Annual report of the State ...

Analyses made by the City Chemist of Newark showed chloride contents ranging from 250 to 2,500 parts per million in water taken from wells in 1942, in this same area. Moreover, in 1947 the general water level ranged from 125 to 200 feet beneath the land surface, and pumping levels in wells ranged from 135 to 290 feet, depending upon the amount of water pumped and the season of the year. In view of these facts, it was decided to make an intensive study of the geology and ground water of the Newark area, and to publish a report on the findings. In order to summarize and make generally available our knowledge of the quantity and quality of ground-water resources of the area, and to facilitate the planning of ground-water pumpage in the future.

The area included in the present study and referred to herein as the Newark area is shown on figure 1. It lies principally in Essex County, but includes small parts of Hudson and Union Counties. It includes all of the city of Newark, except the extreme western part; the greater part of Harrison; and parts of Kearny, Irvington, East Orange, Bloomfield, and Elizabeth.

The Newark area lies wholly within the physiographic province known as the Piedmont Plain. The southeastern part of the area is a lowland with considerable tidal marsh, and the balance of the area is characterized chiefly by low ridges trending in a northeasterly direction. The average annual rainfall at Newark is approximately 47 inches, and the mean annual temperature is about 53°F.

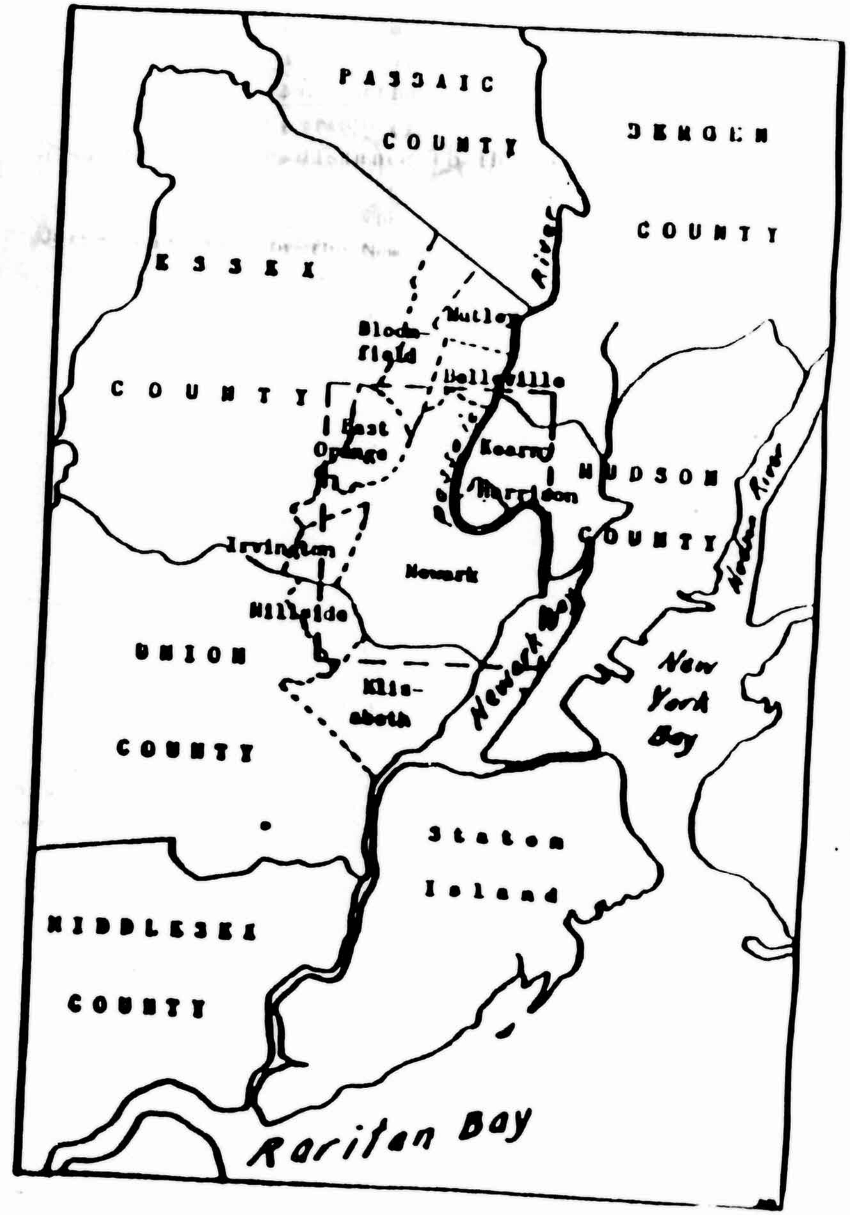


Figure 1 northeastern New Jersey [illegible]

Acknowledgments

This report is the result of cooperative work by the Geologic and Topographic Survey and the Division of Water Policy and Supply, both of the New Jersey Department of Conservation and Economic Development, and by the United States Geological Survey. M. E. Johnson, State Geologist, H. T. Critchlow, Director of the Division of Water Policy and Supply, and A. N. Sayre, Geologist in Charge, Ground Water Branch, U. S. Geological Survey, have exercised general supervision over the work since its beginning. Mr. Johnson and Henry C. Barksdale, District Engineer of the Ground Water Branch, U. S. Geological Survey, have shared local responsibility for the progress and details of the work. The gathering of the data necessary for the preparation of this report has been largely in the hands of Henry Herpers of the Geologic and Topographic Survey and Jerome M. Ludlow of the U. S. Geological Survey. The greater part of this report was written by Mr. Herpers. The sections on the hydrology of the various formations were written by Mr. Barksdale.

Needing the help of the citizens and industries of Newark, and believing that they would gladly cooperate if they knew the facts, the Newark Chamber of Commerce was advised of the proposed survey and report, and a story giving the reasons for the work and indicating its importance was given the press early 1947. It is now the authors' pleasure to express their sincere appreciation of the help given the project by almost everyone approached. The work of gathering data was materially facilitated by the assistance of the following well contractors: Artesian Well and Equipment Co., C. W. Lauman & Co., Layne-New York Co., Parkhurst Well and Pump Co., Rinbrand Well Drilling Co., Samuel Stothoff Co., and William Stothoff Co. Especially valuable data on the operating characteristics of their wells, and other aid, were freely given by Mr. B. H. Bishop and other engineering personnel of P. Ballantine & Sons and by Mr. Wm. C. Helmstaedter, Mechanical Engineer, and others of the Celanese Corporation of America. Particular acknowledgment is made of the assistance

rendered by P. Ballantine & Sons in making their well field available for pumping tests and altering their plant routine to meet the requirements of the test. The Division of Water and the Department of Health of the City of Newark have assisted materially in locating wells and in furnishing records of analyses of well water.

OUTLINE OF GEOLOGY

The Newark area lies wholly within the section of New Jersey underlain by the Newark group of rocks of Triassic age. These rocks form a belt extending from the Hudson River across central New Jersey, Pennsylvania, and Maryland, and into Virginia. They consist of shale, sandstone, argillite, and conglomerate with included sheets, sills, and dikes of trap rock (basalt and diabase).

In New Jersey, the sedimentary rocks of the Newark group have been divided on the basis of their lithology into three units. The lowest is chiefly red, buff, or gray arkosic sandstone and is called the Stockton formation; the middle unit, called the Lockatong formation, is composed largely of gray, purplish-gray, or dull-red argillite; and the uppermost unit, the Brunswick formation; consists chiefly of soft red shale and red sandstone. The Brunswick formation is the bedrock throughout the Newark area. In general, the strata have been tilted northwestward and locally they have been warped into gentle flexures with occasional faulting. The harder beds form ridges, most of which trend north eastward.

The northern part of the belt of Triassic rocks was glaciated in late geologic time, so that much of the surface is covered with a mantle of glacial drift which in many places is thick enough to conceal the bedrock surface. Although the bedrock crops out in only a few places, it accounts for the relief in the western part of the Newark area. There the covering of glacial is thin. In the eastern section the bedrock is [illegible] led by thick deposits [illegible] thinner beds of sand and gravel, and, although topographically this region is a plain, borings have shown that the surface of the underlying bedrock does not conform with the ground surface. (See figure 2). The valleys of many of the streams in the glaciated area contain terraces of sand and gravel of glacial origin.

The geologic history of the area since the beginning of Triassic time is relatively simple. During Triassic time, sands and muds were deposited in an arid basin. Near the end of Triassic time the beds were faulted and tilted toward the northwest. Later erosion reduced the surface to a plain, over which the sea then advanced an indeterminate distance to the northwest. Sands and clays, such as those found in the coastal plain, were deposited in this sea. Still later, the sea withdrew and the forces of erosion removed the sediments of the coastal plain and then etched out the larger topographic features that we see today. During the Pleistocene epoch the details of the topography were altered by the ice. Hills were smoothed somewhat and much drift was deposited. The drift in some places filled valleys existing prior to glaciation and effected important changes in drainage. A general rise of sea level at the close of the Pleistocene epoch flooded low areas adjacent to the coast, forming Newark Bay at the junction of the Hackensack and Passaic Rivers. Since then the meadows have been formed by stream deposits, and very, very recently -- in terms of the geologic calendar -- much meadowland has been reclaimed by suitable drainage and by filling. A typical example of such "made" land is the area upon which Newark Airport has been built.

The succession of formations in the Newark area arranged in normal sequence (i.e., youngest formation at top) is shown in the following table.

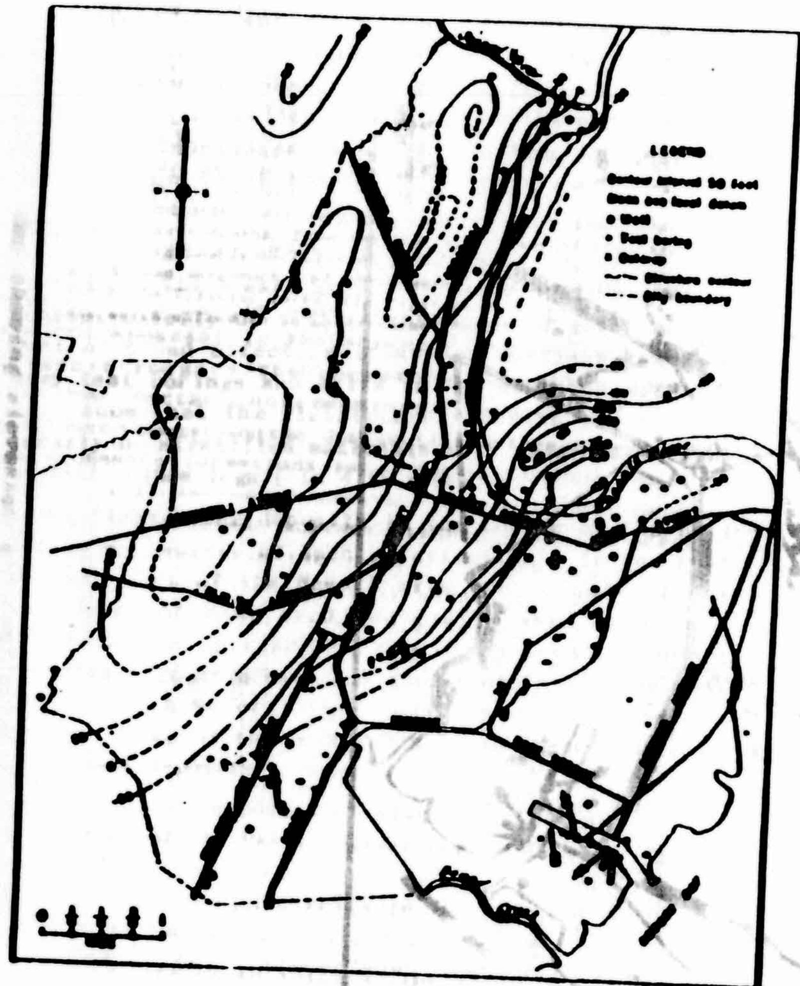


Figure 2.-Map showing elevation and configuration of bedrock beneath Newark, N. J., and vicinity.

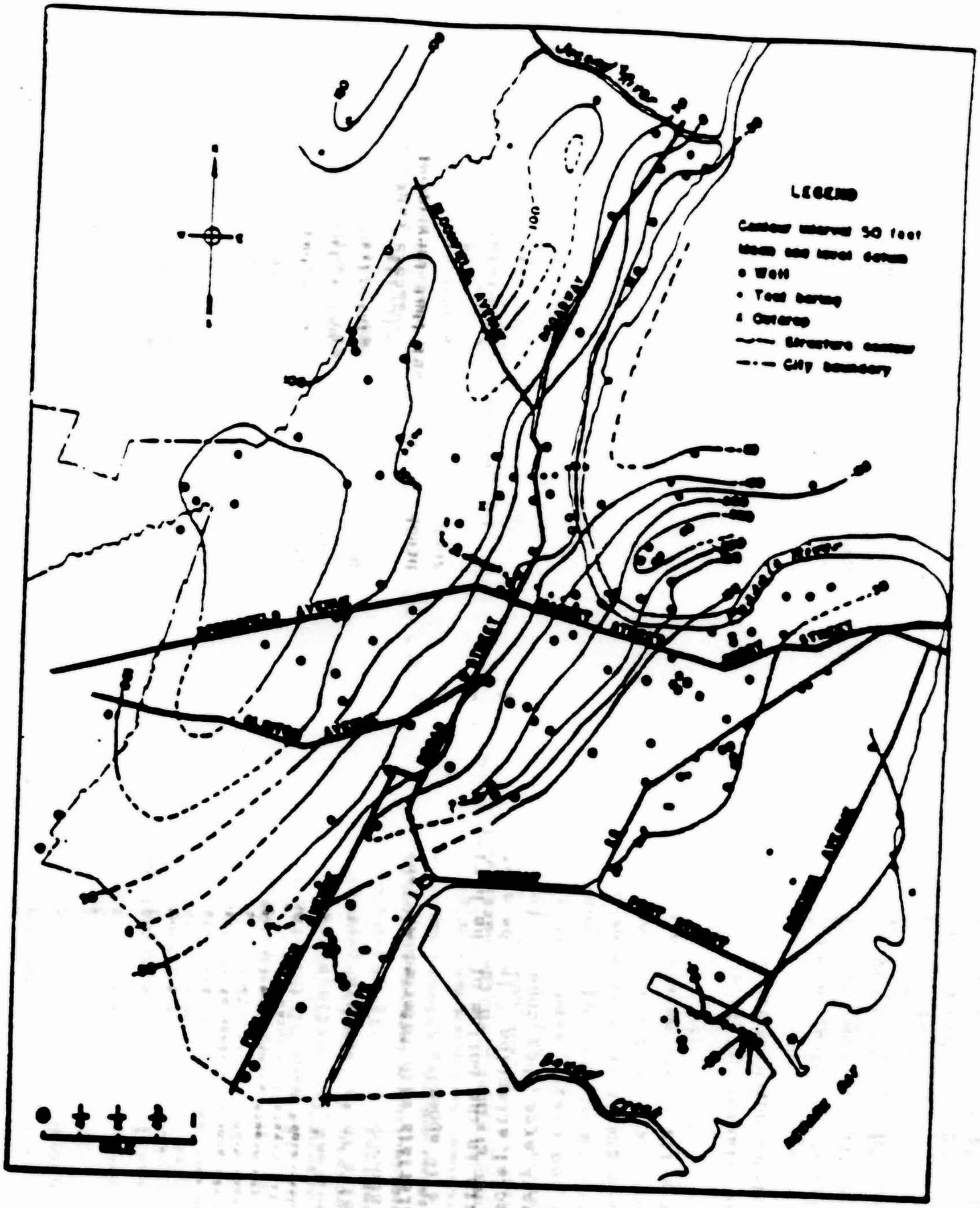


Figure 2.-Map showing elevation and configuration of bedrock beneath Newark, N. J., and vicinity.

Table 1.--Stratigraphic table in the Newark area

Cenozoic era
- Quaternary system
  - Recent series
    - Alluvium and meadow muck
  - Pleistocene series
    - Glacial till and stratified deposits of glacial origin

UNCONFORMITY

Mesozoic era
- Triassic system
  - Newark group
    - Brunswick formation

UNCONFORMITY

Older rocks [2]

2/The deepest well drilled in Newark failed to pass through the red shale and sandstone at 2,538 feet. It cannot, therefore, be stated with certainty what sort of rock lies below the city at great depths. From the general geology of the Triassic rocks, presumably the Palisade diabase would be found at great depth, and more rocks of the Newark group below the diabase. Below the Triassic rocks lie crystalline rocks of very great age which extend to an undetermined depth.

HYDROLOGY AND GEOLOGY OF THE ROCK FORMATIONS

Recent deposits

Recent deposits are found mainly in the eastern part of the Newark area where they occur in the tidal marshes or meadow lands along Passaic River and bordering Newark Bay. They consist largely of unconsolidated mud and silt with inclusions of peat and other organic materials and occasional lenses of sand and gravel. They have been deposited on top of the Pleistocene sediments, or perhaps in places directly on the Triassic rocks, by the Passaic and Hackensack Rivers and by smaller streams flowing across the area and discharging into those rivers, or into Newark Bay. The Recent deposits range in thickness from a feather edge to 35 feet.

Hydrologically, the Recent deposits are of relatively little importance except as they may transmit water to the underlying rocks or exclude it from them. Their permeability is relatively low and they occur in the parts of the area that are exposed to salt water. Therefore their action as a barrier in retarding the percolation of salt water into the underlying rocks is perhaps their most important function. In this respect they perform imperfectly because there probably are breaks in the cover that they provide at critical points, such as the ship channels in the river and in the bay.

Pleistocene deposits

The Pleistocene deposits in the Newark area are all of glacial origin. They consist of till--an unconsolidated, unstratified, heterogeneous mixture of clay, boulders, and sand--and stratified glacial drift, which is composed of sand and gravel that have been more or less sorted and stratified by the action of glacial waters. The deposits of glacial origin overlie the bedrock throughout practically all the Newark area, the bedrock cropping out only in a few more or less isolated spots. The thickness of the Pleistocene deposits varies gr[illegible]tly. In the western part of the [illegible] they are only [illegible] feet thick, forming a thin vene[illegible] the und[illegible] are so thick that they mask entirely the topography of the underlying rock. The map of the elevation and configuration of the bedrock beneath Newark, N. J., and vicinity (figure 2) shows that, in the area east of Broad Street, there is a large deep valley cut in the bedrock, which is entirely covered by glacial drift. At the surface this area presents the aspect of a plain. The depth to rock in the buried valley ranges from 125 feet to more than 190 feet in Newark, and to as much as 300 feet in Harrison. Farther east in the Newark area, bedrock lies at lesser depths. The buried valley extends northeastward across the city from its southwestern boundary, crossing Frelinghuysen Avenue near its northern end, and then extends east of and roughly parallel to Broad Street, finally crossing over into Harrison, where it bends eastward. It has not yet become possible to show the extension of the valley to the southwest or to the east because of the lack of sufficient reliable boring data, but its course and shape across the city of Newark is fairly accurately known. From its shape as shown on plate 1, it is apparent that the valley slopes toward the northeast, and this direction is therefore the probable direction of flow of the river that cut the valley prior to the Pleistocene epoch.

The character of the Pleistocene deposits varies throughout the Newark area. In general, these deposits consist chiefly of till in that part of the area lying west of Broad Street, whereas the cuttings taken from many test borings and wells in the eastern part of the area show that the Pleistocene deposits there consist largely of stratified materials with interbedded lenses of till. (See logs 1 to 4 in appendix.)

The Pleistocene deposits in the bottom of the buried valley are worthy of special attention. In the southwestern part of the Newark area they consist for the most part of fine sand and clayey sand, but in the northeastern part the bottom of the valley contains deposits of coarse sand and gravel which in many places contain much water. (See logs 1 and 2 in appendix.) In fact, some of the best wells in the Newark area pump from these deposits.

Other coarse deposits of glacial origin are [illegible] in the valley of the Passaic River north of the p[illegible] ere the river makes its great eastward bend.

The Pleistocene deposits are one of the two major aquifers in the area. Their hydrologic function is twofold. In the first place, under favorable circumstances they yield water in substantial quantities directly to wells. In the second place, they absorb and store water from precipitation and from surface sources and transmit it to the underlying rocks.

Where the deposits contain beds of sand and gravel that are thick enough and extensive enough, they yield large quantities of water to wells finished in them. Insofar as is known, these conditions are limited almost entirely to the buried valley, where several wells yielding from 175 to more than 600 gallons per minute have been developed. For example, a well drilled for the Driver Harris Co. in Harrison near the locality where the buried valley crosses the Passaic River yielded 600 g.p.m. with a draw down of approximately 60 feet.

Detailed and extended records of water levels in and of pumpage from wells in this aquifer are not available. It is therefore impossible to say at this time whether water is being withdrawn from this aquifer at a rate less than, equal to, or greater than the rate at which recharge is available. The fact that two or three million gallons of water have been withdrawn daily for a number of years from the sand and gravel in the buried valley suggests that a large quantity of recharge occurs. On the other hand, the fact that the static water levels in some wells tapping this aquifer are now substantially below sea level suggests caution before further developments are made.

A more definite and immediate threat to the safe yield of the gravels of Pleistocene age is the apparent intrusion of salt water from surface sources. Wells near the point where the buried valley crosses the Passaic River are yielding water that contains 200 to 500 parts per million of chloride and is already unsuitable for some uses. Inasmuch as there is hydraulic continuity between the gravels and the underlying rocks, the problem of salt-water intrusion will be discussed in more detail in a section of this report that deals primarily with the wat[illegible]ply from the rocks.

The second function of the Pleistocene deposits, that of absorbing, storing, and transmitting water to the underlying rocks, is, in the aggregate, more important than their yielding water directly to wells. As already indicated, they overlie the rocks to varying thicknesses throughout most of the area. In general, there appears to be some correlation between the thickness and nature of the Pleistocene deposits and the yield of wells tapping the underlying rocks. This is to be expected because the storage capacity of the rocks is relatively low and sustained large yields can be obtained from them only if some adequate source of recharge is available. Where the overlying deposits are thick and moderately porous and permeable, they supply the necessary recharge. On the other hand, where they are thin or relatively impermeable, they may fail to supply recharge to the rocks or may even retard the movement of water into them.

Newark group

Brunswick formation

Geology

As mentioned previously in the outline of the geology of the Newark area, the sedimentary rocks of the Newark group of Triassic age in New Jersey have been divided upon the basis of their lithology into three units--the lower, or Stockton formation, the middle, or Lockatong formation, and the upper, or Brunswick formation. It should now be pointed out that whereas these lithologic distinctions can be made in central New Jersey, they are not apparent in the northern part of the belt of Triassic rocks. The Lockatong formation does not continue farther northeastward than Franklin Park, Middlesex County, and the distinction between the Stockton and Brunswick formations is no longer obvious, as it is farther southwestward, because the whole Newark group becomes, in general, coarser-grained. In the northern part of the State, particularly in Bergen County, these sediments become predominantly sandy and even conglomeratic. In the Newark area, the tendency of the rocks to increase in coarseness toward the northeast is shown by the fact that wells drilled in the southern p[illegible] near the Elizabeth line, have penetrated rock that is chiefly soft red shale, whereas in north Newark, especially near the Belleville line, the rocks are principally sandstone with interbedded shale. In fact, during the latter part of the last century several sandstone quarries were operated in north Newark, especially along Bloomfield Avenue and in the southern part of Branch Brook Park. The change from soft shale to hard sandstone is reflected in the change in topography from a rather flat, low-lying plain with few rock hills in southern Newark to hills with rather pronounced relief in the northern part of the city. In the Newark area, therefore, the bedrock is all designated as Brunswick formation. A representative section showing the variations in the rock under Newark is shown in log 3. (See appendix 1.)

The bedrock originated as sand, silt, and mud which were derived from the erosion of older rocks northwest and southeast of the great basin in which the sediments were laid down during the Triassic period. Three times during the period of deposition great sheets of basaltic lava were poured out on the surface and were then buried by sediments later in the Triassic. The remnants of the flows now form the Watchung Mountains, but it is impossible to state whether or not the flows ever extended as far east as the Newark area, for there are no igneous rocks of this type in that area, so far as is known. Toward the end of the Triassic period, the sediments were intruded by similar magma which apparently did not have enough force to push through to the surface but spread out beneath the surface in a great sill some 900 feet or more thick, usually following the bedding planes of the sediments but frequently cutting across them. Because of erosion, the sill is exposed today in the Palisades in eastern Hudson and Bergen Counties and also in certain mountains in central New Jersey. At the close of Triassic time, the entire Newark group of rocks were tilted toward the northwest, which is their attitude today and in the process they were faulted and greatly fractured.

The tot[illegible] thickness of the rocks of Triassic age in the Newa[illegible]ea is unknown but is estimated at about 6,000 t[illegible] feet

The deepest well drilled in Newark reached a depth of 2,518 feet and failed to pass through the normal red shales and sandstones. It is therefore impossible to state with accuracy what lies below that depth, but presumably a well drilled to great depth in Newark would eventually strike the Palisade diabase, and below that would strike more sedimentary rocks of Triassic age before entering the crystalline basement rocks upon which the Triassic sediments were deposited.

Hydrology

GENERAL.--

The Brunswick formation yields water primarily and almost exclusively from the cracks in the rocks of which it is composed. The primary pore spaces in the rocks are generally so small that water moves through them very slowly, if at all, under the hydraulic gradients that are established by pumping. Were it not for the fact that the formation has been extensively cracked and fractured, and has thus acquired a kind of secondary permeability, it would yield very little water.

There is in the Brunswick formation a kind of modified water-table condition wherein the water is generally free to move in any direction and seek the level determined by the factors affecting recharge and discharge. The various systems of cracks intersect so that water can move more or less freely in all directions. However, the cracks are not of uniform size and capacity in all directions, and water is likely to move more freely in some directions than in others. For the area as a whole, there may be no one direction that is generally more favorable to flow than others. It probably differs from place to place.

The capacity of the formation to store and transmit water decreases with depth. As greater depths are reached, the weight of the overlying materials increases and tends to close the cracks. Thus less and less space is available to store water and the resistance to its movement is increased. It is probable that the cracks that are horizontal, or nearly so, are first affected and most affected in this way. The horizontal cracks tend to distribute water uniformly in all directions, so that the tendency of the water to flow in the direction of the prevailing vertical cracks is probably accentuated with depth. The cracks along the bedding planes, which appear to be very numerous near the surface and are more nearly horizontal than vertical, probably are less and less important with depth.

There is, therefore, little foundation for the common belief that water is transmitted for long distances underground through the Brunswick formation, particularly along the bedding planes of the rocks. It is unlikely that the bedding planes, or rather the horizontal cracks along them, provide the path of least resistance to the flow of water. Actually, water probably flows through the formation most readily in vertical or nearly vertical cracks. Except along major faults, individual vertical cracks are not likely to extend very far without interruption, and are not likely to transmit water for distances greater than 2 or 3 miles. Furthermore, as the vertical cracks necessarily intersect the rock surface locally, they will receive recharge or discharge water locally depending upon the hydraulic gradient.

Certain characteristics of individual wells in the area may be better understood in the light of the foregoing general description of the rocks from which they draw their water. The yield of a well tapping the Brunswick formation depends primarily upon the number and size of the cracks that it encounters below the water table, or more specifically upon their capacity to transmit water. Thus, two adjacent wells may pass through almost identical layers of rock, and one may yield a substantial quantity of water whereas the other may yield very little, depending upon the character of the cracks encountered in each. It is therefore impossible to predict the yield of a proposed well except in general terms, based upon the average yield of other wells in the vicinity. Furthermore, all prediction of yield of wells in the Brunswick formation should be qualified by a statement that the final proof will be the actual yield of the finished well, because the number and capacity of the cracks encountered cannot be determined in advance.

There is usually little or nothing to be gained by deepening an unsuccessful well below the average depth of the productive wells in the area, because the cracks become smaller and probably less numerous with increased depth. It is almost always wiser to move to another site, even if only a short distance away, and to drill another well, rather than to double the depth of a poor well in the hope of improving its yield. It is obviously impossible to determine the nature and pattern of the deeply buried cracks at any site from observations at the surface. There are, of course, rare exceptions to this general rule, but it holds well enough to make its observance sound economic policy. For example, it has already been mentioned that one well in Newark was drilled to a depth of more then 2,500 feet. That well, though very expensive, was unproductive.

As a general rule, in the Brunswick formation most of the productive cracks occur within the first 200 or 300 feet of the rock. In some parts of the Newark area, however, most of the productive wells penetrate the rock 400 or even 500 feet. Sufficient data are not available to indicate whether the rock there is unusually productive at great depths or whether many of these wells are unnecessarily deep, because most of them were not tested before they had been drilled to their full depth. It is possible that the bottom parts of many of these holes are not very productive.

An interesting though probably extreme example of a well that was unproductive at depth is one about 800 feet deep that was observed in the course of the studies preceding this report. When the regional water level declined, the yield of this well dropped sharply. With the thought that some of the productive cracks might have been clogged either in the drilling or subsequently, the owner employed a driller to clean out and redevelop the well. A thorough job was done and it is unlikely that there remained any cracks that were sealed with mud or otherwise clogged. Nevertheless, the yield of the well did not improve substantially. It was therefore abandoned and made available as an observation well. During the spring and early summer of 1947 the water level in the well declined normally to a level of 161 feet below mean sea level, where it stopped abruptly. While the wat[illegible] levels in other

observation wells in the vicinity continued to decline to about 230 feet below mean sea level and the pumping levels in some adjacent wells were still lower, the water level in this well remained at 161 feet. In the late fall and winter, after the regional water level had recovered to 161 feet, this well again became responsive to variation in pumpage and fluctuated normally. The same performance was repeated in the summer of 1948 and again took place in 1949. Apparently the only explanation for the peculiar behavior of the water level is that no cracks were encountered below 161 feet and that therefore the well is water-tight at greater depths. This is, no doubt, an unusual case, but it does serve to emphasize the dependence of the yield of rock wells upon cracks, as well as the relative unimportance of horizontal cracks at depth and the decreased chance of hitting good cracks at increased depth.

The character of the Brunswick formation as an aquifer also explains another peculiarity of the wells that tap it. Ordinarily, in a relatively uniform aquifer the interference between two or more wells is dependent mainly upon the distance between them. In the Brunswick formation, as in similar aquifers, a pumping well often affects the water level in a second well substantially more than that in a third well at the same distance but in a different direction. The explanation of this peculiarity, of course, lies in the fact that the different systems of cracks differ in their capacity to transmit water.

The Brunswick formation does not yield water as freely as some of the other important water-bearing formations in the State, especially those that yield water from the pore spaces in well-sorted medium-to coarse-grained sand and gravel. This is due primarily to the fact that its capacity to store and transmit water is smaller. The deficiency is most marked in regard to its capacity to store water. The specific yield (the storage capacity expressed as a percentage of the volume of the aquifer) of a coarse, well-sorted sand is frequently as much as 25 percent. The specific yield of the upper 100 feet of the Brunswick formation, based upon the volume of cracks, is probably more nearly in [illegible] order of [illegible] percent. Therefore, it is easy [illegible] [illegible]stand the [illegible] drologic importance of sources of ready recharge such as bodies of surface water or of relatively permeable sand and gravel in areas where large quantities of ground water are withdrawn from the formation. The capacity of individual cracks to transmit water is probably larger than that of a comparable volume of pore spaces in a sand. It is not surprising, therefore, to find that the capacity of the Brunswick formation to transmit water is about one-fourth of that of some of our important sand aquifers in spite of the relatively limited volume of cracks.

Pumping Test. - In January 1949, through the cooperation of the officials of P. Ballantine & Sons, two pumping tests were run on wells tapping the Brunswick formation. For several days all the company's wells were operated to suit the requirements of the test. At each of their two plants two wells were run continuously until conditions approaching equilibrium were established. This involved wasting water at some times of the day in order to have an adequate supply available at others, but it seemed to be the only practical way of reaching an approximate state of equilibrium. After about 24 hours, the effects of changing the rates of pumping at the plant appeared to have been eliminated, and, with one exception which will be discussed later, the effects of pumping at other plants in the area seemed to be of little importance.

The wells pumped during the two tests are shown on figure 3. They were selected to provide the best possible spread of observation wells in as many directions as possible. The first test was made by pumping well 1 at plant 1. This well is centrally located, and water levels were observed in seven other wells at various distances and directions from it. In the second test, well 9 at plant 2 was pumped and water levels were observed in the same group of observation wells. In this test, however, the pumping well was in one corner of the well field so that the distances to the observation wells were greater and their directions were less varied.

During the pumping tests, water-stage recorders were maintained on well 5 at plant 1 and on wells 8 and 10 at plant 2. The water levels in well 7 at plant 1 were measured by air pressure, using an 8-inch pressure gage on which it was possible to note changes of water level of one- or two-tenths of a foot. The water levels in the other wells were measured by air pressure, using ordinary pressure gages that would probably not indicate changes of water level of less than one foot. There were only four wells, therefore, in which water levels could be observed accurately; of these wells 5 and 7 at plant 1 appear to have been drawn down below the most productive cracks encountered in them. The best observations were therefore obtained in wells 8 and 10 at plant 2. Two of the wells observed, wells 4 and 8 at plant 1, were operated continuously during both tests to supply water for manufacturing purposes.

During the first test a prompt and distinct effect was observed in well 8, plant 2, when well 1, plant 1, was started and again when it was shut down. This seemed to indicate that these two wells tapped the same system of cracks. No distinct effect was observed in any of the other wells during this first test, even though it was continued for several hours. Well 7 at plant 1 is almost in a straight line with well 8, plant 2, and well 1, plant 1. It is in the opposite direction from well 1 and only about half as far away, yet no effect was observed in it. No definite effects of pumping or shut-down were observed in any of the other wells.

During the second test, when well 9, plant 2, was pumped a prompt and distinct effect was observed in well 10, plant 2, both at the beginning and at the end of pumping. None of the other wells being observed showed any distinct effect. It is interesting to note, however, that the recorder on well 10 showed a small but definite effect whenever well 27 at the plant of the Celanese Corporation of America was started or stopped. This well is approximately southwest of well 10 and about 2,400 feet from it, a distance substantially greater than that between any of the wells at the Ballantine plants.

It i[illegible] lieved to be significant [illegible] all the wells that [illegible] to affe[illegible]

REFERENCE NO. 7

26-22-333

5/14/79

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Permit No. 26-4784

Application No. ______

County ______

WELL RECORD

1. OWNER Scientific Chemical Co. ADDRESS 411 Wilson St., Newark, N.J.

Owner's Well No. 1 SURFACE ELEVATION 22 Feet (Above mean sea level)

2. LOCATION same

3. DATE COMPLETED Mar. 6, 1980 DRILLER Ernest S. Richardson

4. DIAMETER: Top 6 Inches Bottom 6 Inches TOTAL DEPTH 170 Feet

5. CASING: Type steel-drive Diameter 6 Inches Length 51 Feet

6. SCREEN: Type —— Size of Opening ___ Diameter ______ Inches Length ______ Feet

Range in Depth { Top ______ Feet; Bottom ______ Feet } Geologic Formation ______

Tail piece: Diameter ______ Inches Length ______ Feet

7. WELL FLOWS NATURALLY —— Gallons per Minute at ______ Feet above surface

Water rises to ______ Feet above surface

8. RECORD OF TEST Date Mar. 3, 1980 Yield 70 Gallons per minute

Static water level before pumping 12 Feet below surface

Pumping level 70 feet below surface after 3 hours pumping

Drawdown 58 Feet Specific Capacity ______ Gals. per min. per ft. of drawdown

How Pumped submersible pump How measured barrel

Observed effect on nearby wells none

9. PERMANENT PUMPING EQUIPMENT:

Type submersible Mfrs. Name Red Jacket

Capacity 60 G.P.M. How Driven electric H.P. 5 R.P.M. 3450

Depth of Pump in well 126 Feet Depth of Footpiece in well —— Feet

Depth of Air Line in well —— Feet Type of Meter on Pump ______ Size ___ Inches

10. USED FOR cooling AMOUNT { Average 35,000 Gallons Daily; Maximum 45,000 Gallons Daily }

11. QUALITY OF WATER good Sample: Yes ___ No. ___

Taste none Odor none Color clear Temp. 54 °F

12. LOG ______ (Give details on back of sheet or on separate sheet, if more room is needed) Are samples available? ______ (If electric log was made, please ...)

13. SOURCE OF DATA top of well

14. DATA OBTAINED BY Ernest S. Richardson Date Mar. 3, 1980

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, ... uses of the water, sketch map, sketch of special casing arrangements etc.)

REFERENCE NO. 8

J. Marzano & Sons, Inc.
Mr. John T. Marzano
111 Houston Street
Newark, N.J. 07105

REPORT
OF
SOIL BORING & SOILS ENGINEERING
FOR SITE AT
257 WILSON AVENUE
NEWARK, NEW JERSEY
FOR
J. MARZANO & SONS, INC.

Project 83-116/So-1999
Report No. 194

TECHNICAL TESTING INC.
TESTING ENGINEERS, LABORATORY, AND INSPECTION SERVICE
42 Dayton Road, Jamesburg, New Jersey 08831
WILLIAM A. DARLEY, P.E. August 8, 1983 PHONE (201) 521-11

TECHNICAL TESTING INC.

TESTING ENGINEERS LABORATORY AND INSPECTION SERVICE
Telephone (201)521-1110
MAIL · P O BOX 1211 NEW BRUNSWICK NEW JERSEY 08903

REPORT OF SOIL BORINGS AND SOILS ENGINEERING

PROJECT NO. 83-116/So-1999 Report No. 194 DATE August 8, 1983

CLIENT	J. Marzano & Sons, Inc.
CONTRACTOR	Client
PROJECT	Building Site
LOCATION	257 Wilson Avenue, Newark, N.J.
REPORTED TO	Client's Mr. John T. Marzano

At the request of the client, six soil test borings were performed at the site of an existing auto junk yard, Garden State Auto Salvage, Inc. The site is over 50-percent covered with old autos. The client located the test borings.

Plate 1 on the next page is a copy of a portion of a plan given to Technical Testing. It had no title, but is apparently an old aerial topographical map. As can be noted the site is rather flat, but from observation there is a slight increase in grade toward the rear. While Plate 1 shows the location of former buildings on the site, only a one-story steel frame on a concrete slab exists as shown.

The basic results of the tests are presented in the form of soil boring logs to the rear of this report. Preceding these logs are two pages of descriptive infomation to aid in interpreting the results. Herein is the final report with test results. Also presented are conclusions and recommendations.

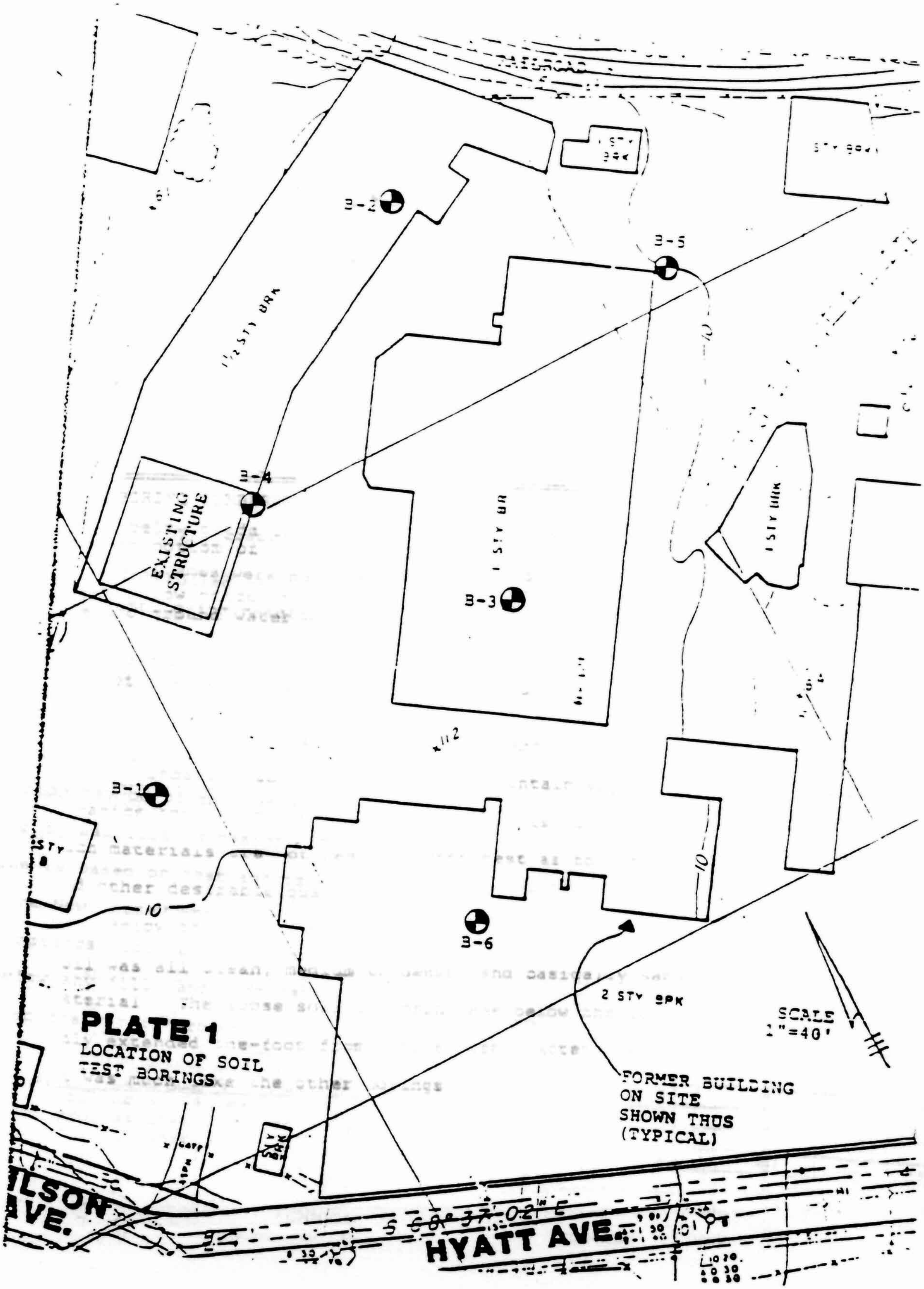


PLATE 1
LOCATION OF SOIL TEST BORINGS

Mr. Marzano
257 Wilson Ave.
Newark, N.J.

August 8, 1983
Proj. So-1999
Report No. 194

TEST BORING RESULTS

The soil test borings showed generally the same results namely some shallow debris fill over basically all sand and silt. Some pertinent data from the borings is tabulated in Table A below:

TABLE A

TABULATION OF SOME SIGNIFICANT DATA FROM THE BORINGS

TEST BORING NUMBER	B-1	B-2	B-3	B-4	B-5	B-6
Depth below grade in feet to bottom of fill	None	1	2	5	2½	4
Depth below grade in feet to ground water level	7	8	8	9½	8	8
Final depth of boring in feet	17	25	20	20	24	18

The fill contained some building debris (concrete, brick, cinders, etc.), but it did not contain any organics and was rather dense; however, test borings in such materials are not really a good test as to density and other desirable qualities.

Below the fill with the exception of Boring B-4, the soil was all clean, medium to dense, and basically sandy material. The loose soil in Boring B-4 below the fill only extended one-foot from 5 to 6-feet. After that, it was much like the other borings.

Ground water was observed, as can be noted from Table A, at between 7 to 9½-feet below grade. The borings were carried down to between 17 to 25-feet.

CONCLUSIONS AND RECOMMENDATIONS

An evaluation was performed, based on the data gathered. For the soil conditions encountered, spread footings supported in the competent virgin soils are feasible and economically attractive. Therefore, alternate foundation schemes were not considered.

Based on the test boring results, a review of the soil samples in the laboratory and experience in the area, it is concluded that the site is satisfactory for conventional construction. A safe soil pressure of 3000 pounds per square foot may be used for the foundation which may be of the normal continuous type or other spread footing design. This soil bearing value is based on test and is conservative and within the New Jersey State Uniform Construction Code. All footings, both exterior and interior should be below any fill, and soft material below the fill, into the virgin ground.

The fill itself, however, is sufficient good and dense to support a pavement, slab-on-grade directly, or any fill over it with a slab-on-grade on new fill provided there is placed a subbase being a minimum of 2-feet in thickness. Such subbase should be a good bankrun and gravel mixture with no more than 15-percent passing the No. 200 sieve. Prior to placing any subbase material or fill, proofrolling is recommended to locate any soft spots which may exist. Any soft spots should be cut out and refilled with controlled compacted fill.

Ground water should not present a problem during construction.

On site excavated material that does not contain any debris can be used on a select basis for backfill purposes. A select basis, as used here, means that the material as excavated should be reviewed and tested as necessary to determine if it is suitable.

Respectfully submitted
TECHNICAL TESTING INC.

By William A. Dailey
Professional Engineer
License

Distribution
Marzano & Sons, Inc.
Attn: Mr. John T.
Houston Street
Newark, N.J.

TECHNICAL TESTING, INC.

Mr. Marzano
257 Wilson Ave.
Newark, N.J.

August 8, 1993
Proj. 93-1999
Report No. 194

All fill work should be done on a controlled basis meaning: a) the soil to be used as fill should be approved, b) the fill should be placed in lifts not exceeding 12-inches when loose, c) the fill should be compacted lift by lift, d) in-place density (compaction) tests should be mase as the work progresses, e) no new lift placed until the prior one has been tested and approved, and f) the work upon completion should be certified by a soils engineer such as Technical Testing. The suggested compaction criteria is 95 percent of the maximum density obtained in the laboratory using the modified Proctor test method (ASTM D 1557). Perhaps large compaction equipment, which are more efficient, cannot be used because of tight working quarters at some locations such as around columns. In those cases, small hand operated compactors should be utilized.

GENERAL QUALIFICATIONS

Special attention is called to the sheet of General Qualifications on the next page.

Respectfully submitted,
TECHNICAL TESTING INC.

By William A. Dailey
William A. Dailey
Professional Engineer
N.J. License No. 11319

Distribution
3-J. Marzano & Sons, Inc.
Attn: Mr. John T. Marzano
111 Houston Street
Newark, N.J. 07105

J. MARIANO & SONS, INC., WILSON AVE., NEWARK
T.T.I. PROJ. NO. 83-116/So-1999

B-1 BORING NO.
-83 DATE
RADE ELEVATION

BORINGS BY
TECHNICAL TESTING CO.

EARTH 17
ROCK
TOTAL 17

WATER OBSERVED AT 7'0"

DEPTH-FT	SAMPLE	SAMPLE NO	SAMPLER BLOWS/6"	DEPTH OF STRATA	DESCRIPTION OF STRATA
0				0'0"	6" Brown SILT And DEBRIS
1	X	1	5 7 6 5	1'0"	Dark Brown SILT, Little F SAND, Trace GRAVEL
2	X			2'0"	Brown F SAND And SILT, Trace GRAVEL
3	X	2	5 4 3 5		
4	X				
5	X	3	5 7 5 5		Brown F SAND, Trace SILT, Trace GRAVEL
6	X				
7	X	4	4 3 5 5		
8	X			8'0"	
9	X	5	7 7 6 7		Red-Brown F SAND, Little SILT
10	X				
11				11'0"	
12					Red-Brown SILT, Trace F SAND
13				13'0"	
14	X	6	3 3 4 10		Red-Brown SILT, Trace F SAND, Trace CLAY
15	X			15'6"	
16					Red-Brown SILT, Little M-F SAND, Trace CLAY
17	X	7	40		Boring Terminated At 17'0"

TECHNICAL TESTING, INC.

J. MARIANO & SONS, INC., WILSON AVE., NEWARK

B-2 BORING NO. T.T.I. PROJ. NO. 83-116/80-1999

7-18-83 DATE

GRADE ELEVATION

BORINGS BY TECHNICAL TESTING CO.

EARTH 25'0"
ROCK 0'0"
TOTAL 25'0"

WATER OBSERVED AT 8'0"

DEPTH-FT	SAMPLE NO	SAMPLER BLOWS/6"
0–2	1	4, 12, 11, 11
2–4	2	8, 8, 8, 8
4–6	3	8, 9, 8, 10
6–8	4	9, 8, 8, 8
8–10	5	8, 9, 8, 8
14–15	6	5, 5, 4, 4
19–20	7	4, 4, 3, 3

DEPTH OF STRATA	DESCRIPTION OF STRATA
0'0"	
0'6"	Brown SILT And F SAND
1'0"	CINDERS
2'0"	Brown M-F SAND, Trace GRAVEL, Trace SILT
4'0"	Brown M-F SAND, Trace GRAVEL
6'0"	Brown F SAND, Little SILT
10'0"	Brown M-F SAND, Trace SILT
12'0"	Red-Brown SILT And F SAND, Trace CLAY
15'0"	Red-Brown M-F SAND
20'0"	Red-Brown F SAND And SILT

TECHNICAL TESTING, INC.

J. MARZANO & SONS, INC., WILSON AVE., NEWARK

B-2 (cont.) BORING NO. T.T.I. PROJ. NO. 83-116/So-1999

7-18-83 DATE

GRADE ELEVATION

BORINGS BY
TECHNICAL TESTING CO.

EARTH 25'0"
ROCK 0'0"
TOTAL 25'0"

WATER OBSERVED AT 8'0"

DEPTH-FT	SAMPLE	SAMPLE NO	SAMPLER BLOWS/6"	DEPTH OF STRATA	DESCRIPTION OF STRATA
20					
21					
22					
23	X	8	36		Red-Brown F SAND, Trace SILT
24			35		
			40		
			41		
					Boring Terminated At 25'0"

B-2 (cont.)

TECHNICAL TESTING, INC.

J. MARIANO & SONS, INC., WILSON AVE., NEWARK
T.T.I. PROJ. NO. 83-116/S3-1399

B-3 BORING NO.
7-19-83 DATE
GRADE ELEVATION

BORINGS BY
TECHNICAL TESTING CO.

EARTH 20'0"
ROCK 0'0"
TOTAL 20'0"

WATER OBSERVED AT 8'0"

DEPTH-FT	SAMPLE NO	SAMPLER BLOWS/6"	DEPTH OF STRATA	DESCRIPTION OF STRATA
0			0'0"	
1–2	1	9, 21, 9, 8	2'0"	Brown SILT And DEBRIS (CONCRETE, BRICK, CINDERS), Trace GRAVEL, Trace CLAY
3–4	2	6, 7, 12, 12	3'0"	Red-Brown M-F SAND, Little GRAVEL
			4'0"	Brown F SAND, Trace GRAVEL
5–6	3	10, 10, 11, 13		Brown F SAND, Trace SILT
7–8	4	9, 12, 15, 15		
9–10	5	12, 12, 11, 9	10'0"	
11–13				Red-Brown F SAND, Trace SILT
14–15	6	3, 2, 3, 3		
16–18			18'0"	
19–20	7	8, 12, 14, 18		Brown M-F SAND

Boring Terminated At 20'0"

TECHNICAL TESTING, INC.

J. MARZANO & SONS, INC., WILSON AVE., NEWARK
T.T.I. PROJ. NO. 83-116/So-1999

B-4 BORING NO.
7-19-83 DATE
GRADE ELEVATION

BORINGS BY
TECHNICAL TESTING CO.

EARTH 20'0"
ROCK 0'0"
TOTAL 20'0"

WATER OBSERVED AT 9'6"

DEPTH-FT	SAMPLE	SAMPLE NO	SAMPLER BLOWS/6"	DEPTH OF STRATA	DESCRIPTION OF STRATA
0				0'0"	
1–2	X	1	9 24 15 14	1'0"	Brown SILT, Some DEBRIS (CONCRETE, BRICK, CINDERS)
3–4	X	2	13 10 8 5		Orange M-F SAND, Trace GRAVEL
5–6	X	3	5 4 2 1	4'6"	
				5'0"	Black CINDERS, Some STONE
				6'0"	Red-Brown M-F SAND
7–8	X	4	3 4 4 3		Brown F SAND, Trace SILT, Trace Black F SAND
9–10	X	5	3 3 2 3	10'0"	
11–12					Mixed Layers Of Black And Brown SILT, Some F SAND
13–14	X	6	7 6 6 6	15'0"	
15–18				18'0"	Brown SILT And F SAND
19–20	X	7	14 16 16 22		Brown M-F SAND

Boring Terminated At 20'0"

B-4

TECHNICAL TESTING, INC.

J. MARZANO & SONS, INC., WILSON AVE., NEWARK

B-5 BORING NO. T.T.I. PROJ. NO. 83-116/S0-1999

7-20-83 DATE

GRADE ELEVATION

BORINGS BY TECHNICAL TESTING CO.

WATER OBSERVED AT 8'0"

EARTH 24'0"
ROCK 0'0"
TOTAL 24'0"

DEPTH-FT	SAMPLE	SAMPLE NO	SAMPLER BLOWS/6"	DEPTH OF STRATA	DESCRIPTION OF STRATA
0				0'0"	
0–2'6"	X	1	9, 21, 18, 16"	2'6"	Brown SILT, Little STONE, Little DEBRIS (CONCRETE, CINDERS, BRICK), Trace F SAND, Trace CLAY
2'6"–4	X	2	8, 4, 4, 4	4'0"	Orange-Brown M-F SAND, Little Brown SILT, Trace GRAVEL
4–6	X	3	3, 6, 9, 7	6'0"	Red-Brown F SAND, Some GRAVEL, Trace SILT
6–8	X	4	8, 14, 12, 8	7'6"	Black-Brown SILT And F SAND, Trace GRAVEL
8–10	X	5	8, 10, 10, 14	9'0"	Red-Brown M-F SAND, Trace GRAVEL
10–13				11'6"	Red-Brown SILT, Trace F SAND
13–15	X	6	6, 6, 7, 8	15'0"	Brown F SAND, Trace SILT, Trace Black F SAND
15–18				18'0"	Brown M-F SAND
18–20	X	7	5, 4, 3, 4	20'0"	Red-Brown SILT And F SAND

TECHNICAL TESTING, INC.

J. MARZANO & SONS, INC., WILSON AVE., NEWARK

5 (cont.) BORING NO. T.T.I. PROJ. NO. 83-116/So-1999
7-20-83 DATE
GRADE ELEVATION

BORINGS BY
TECHNICAL TESTING CO.

WATER OBSERVED AT 8'0"

EARTH 24
ROCK 0
TOTAL 24'

DEPTH-FT	SAMPLE	SAMPLE NO	SAMPLER BLOWS/6"	DEPTH OF STRATA	DESCRIPTION OF STRATA
20				20'0"	
21					Red-Brown SILT, Trace F SAND, Trace CLAY
22				22'6"	
23	X	8	18 60		Brown F SAND, Trace SILT
24					Boring Terminated At 24'0"

B-5 (cont.)

TECHNICAL TESTING, INC.

J. MARZANO & SONS, INC., WILSON AVE., NEWARK

B-6 BORING NO. T.T.I. PROJ. NO. 83-116/So-1999

-20-83 DATE

GRADE ELEVATION

BORINGS BY TECHNICAL TESTING CO.

EARTH 18'0"
ROCK 0'0"
TOTAL 18'0"

WATER OBSERVED AT 8'0"

DEPTH-FT	SAMPLE	SAMPLE NO	SAMPLER BLOWS/6"	DEPTH OF STRATA	DESCRIPTION OF STRATA
0				0'0"	6" Brown SILT And DEBRIS
0–2	X	1	5, 5, 5, 3		Brown SILT And F SAND, Little DEBRIS (CINDERS, BRICK, CRUSHED STONE), Trace GRAVEL
2–4	X	2	2, 2, 5, 11	4'0"	
4–6	X	3	13, 15, 19, 16		Brown F SAND, Trace SILT
6–8	X	4	10, 7, 6, 6		
8–10	X	5	5, 7, 7, 7	10'0"	
10–13				13'0"	Red-Brown SILT And F SAND
13–15	X	6	5, 3, 2, 2	16'6"	Red-Brown SILT And F SAND, Trace CLAY
18	X		11		Brown M-F SAND
					Boring Terminated At 18'0"

B-6

TECHNICAL TESTING, INC.

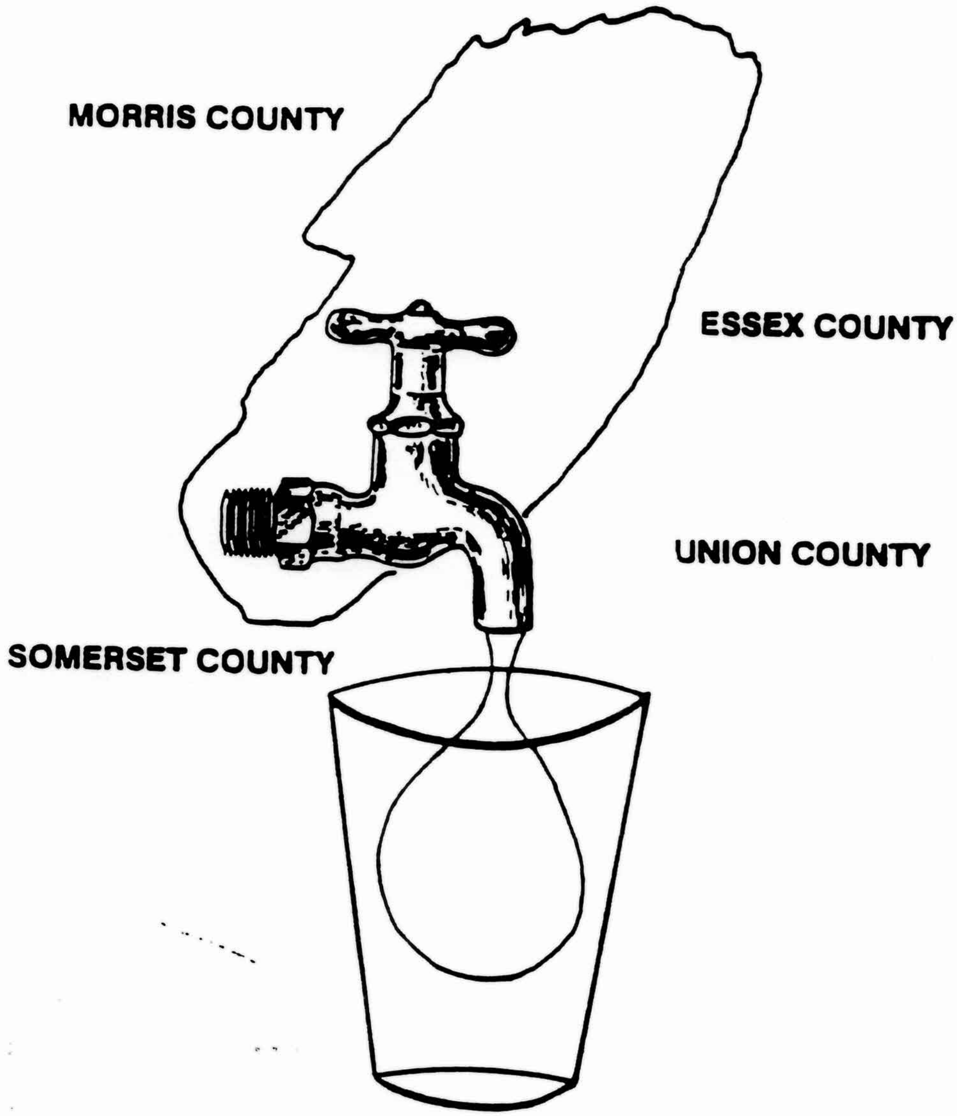
REFERENCE NO. 9

BEDROCK TOPOGRAPHY AND THICKNESS OF PLEISTOCENE DEPOSITS IN UNION COUNTY AND ADJACENT AREAS, NEW JERSEY

By
Bronius Nemickas
1974

REFERENCE NO. 10

THE HYDROGEOLOGY OF THE BURIED VALLEY AQUIFER SYSTEM



PASSAIC RIVER COALITION

246 Madisonville Road
Basking Ridge, New Jersey 07920
(201) 766-7550

1983

size and number of the intersecting fractures. The yield of such rocks can vary considerably within a short distance, both horizontally and vertically. Because fractures are wider toward the surface due to weathering, a well in Precambrian rock is unlikely to supply much water below 300 feet. The 79 large-diameter public supply, industrial, and commercial wells operating in 1965 throughout Morris County yielded an approximate average of 121 gallons per minute (gpm), and the maximum and minimum yields were 400 and 5 gpm respectively. The larger amounts are usually associated with fault zones. (Gill and Vecchioli, 1965).

Water quality from Precambrian wells is generally good. Hardness ranges from soft (less than 50 ppm) to moderately hard (60-120 ppm); pH ranges from slightly acidic to slightly alkaline; and iron occurs in objectionable quantities in some areas (Gill and Vecchioli, 1965).

Newark Group: Brunswick Formation

The Brunswick Formation serves an an aquifer in the following communities: Chatham Borough, East Hanover Township, Florham Park Borough, Hanover Township, Harding Township, Lincoln Park Borough, Montville Township, Morris Township, Town of Morristown, Parsippany-Troy Hills Township, and Passaic Township in Morris County; Caldwell Borough, Fairfield Borough, Livingston Township, Millburn Township, North Caldwell Borough, Roseland Borough, West Caldwell Borough, and West Orange Town in Essex County; and Berkeley Heights Township, New Providence Borough, and Summit City in Union County (Gill and Vecchioli, 1965; Nichols, 1968a; Nemickas, 1976).

Table 2. Municipalities Entirely or Partially Within the Sole Source Aquifer Designated Area

Somerset County	**Morris County (Cont'd)**
Bernards Township	Hanover Township
Bernardsville	Harding Township
Warren Township	Jefferson Township
	Kinnelon
Union County	Lincoln Park
Berkeley Heights	Madison
New Providence	Mendham
Summit	Mendham Township
	Mine Hill
Essex County	Montville Township
Caldwell	Morris Plains
Essex Fells	Morristown
Fairfield	Morris Township
Livingston	Mountain Lakes
Millburn	Mt. Arlington
North Caldwell	Passaic Township
Roseland	Parsippany-Troy Hills Township
West Caldwell	Randolph Township
	Rockaway
Morris County	Rockaway Township
Boonton	Roxbury
Boonton Township	Sparta
Chatham	Victory Gardens
Chatham Township	Wharton
Denville	
Dover	
East Hanover Township	
Florham Park	

Source: Federal Register Vol. 45, No. 91:30537.

REFERENCE NO. 11

Uncontrolled Hazardous Waste Site Ranking System

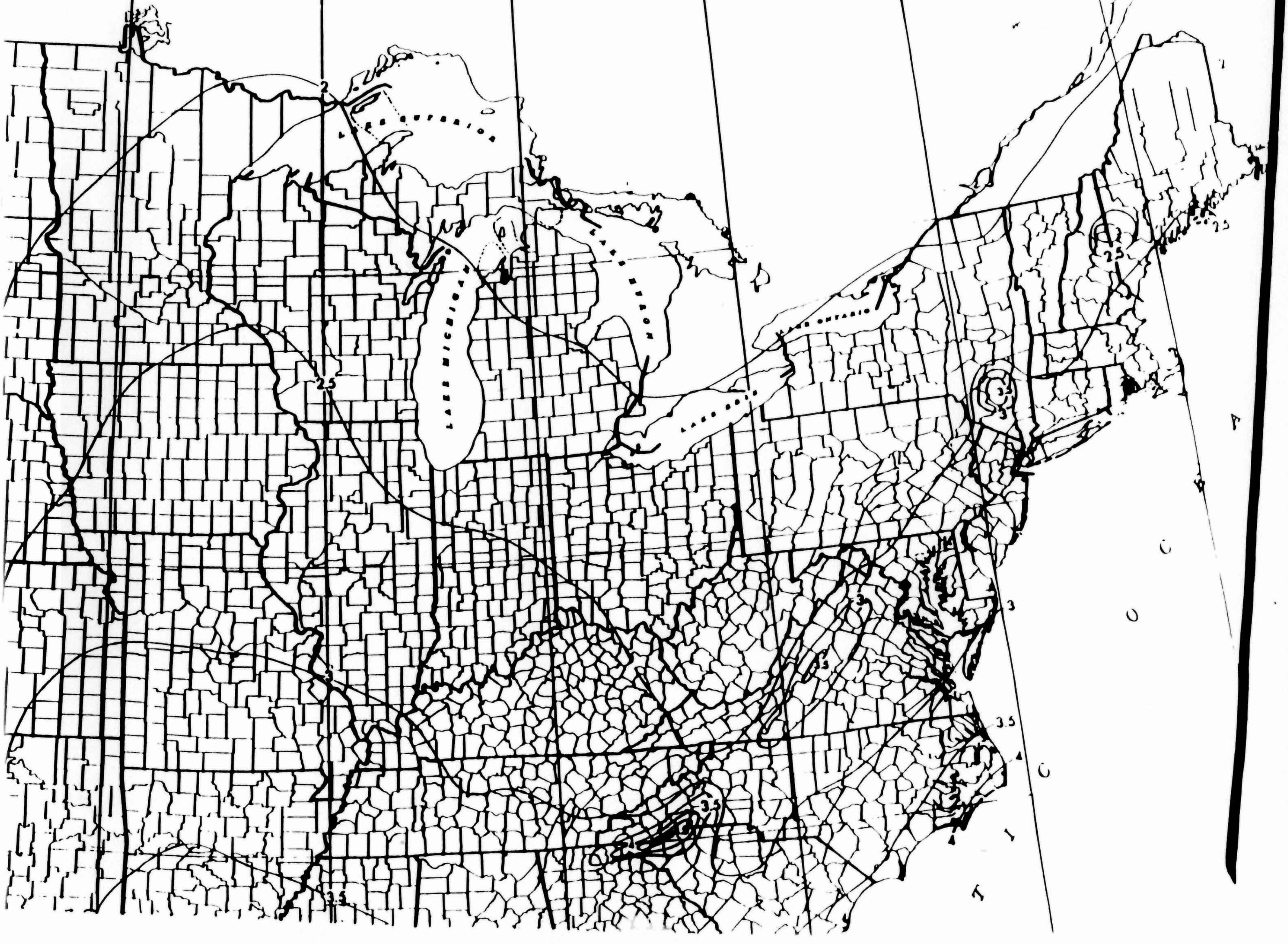
A Users Manual
(HW-10)

Originally Published in
the July 16, 1982, *Federal Register*

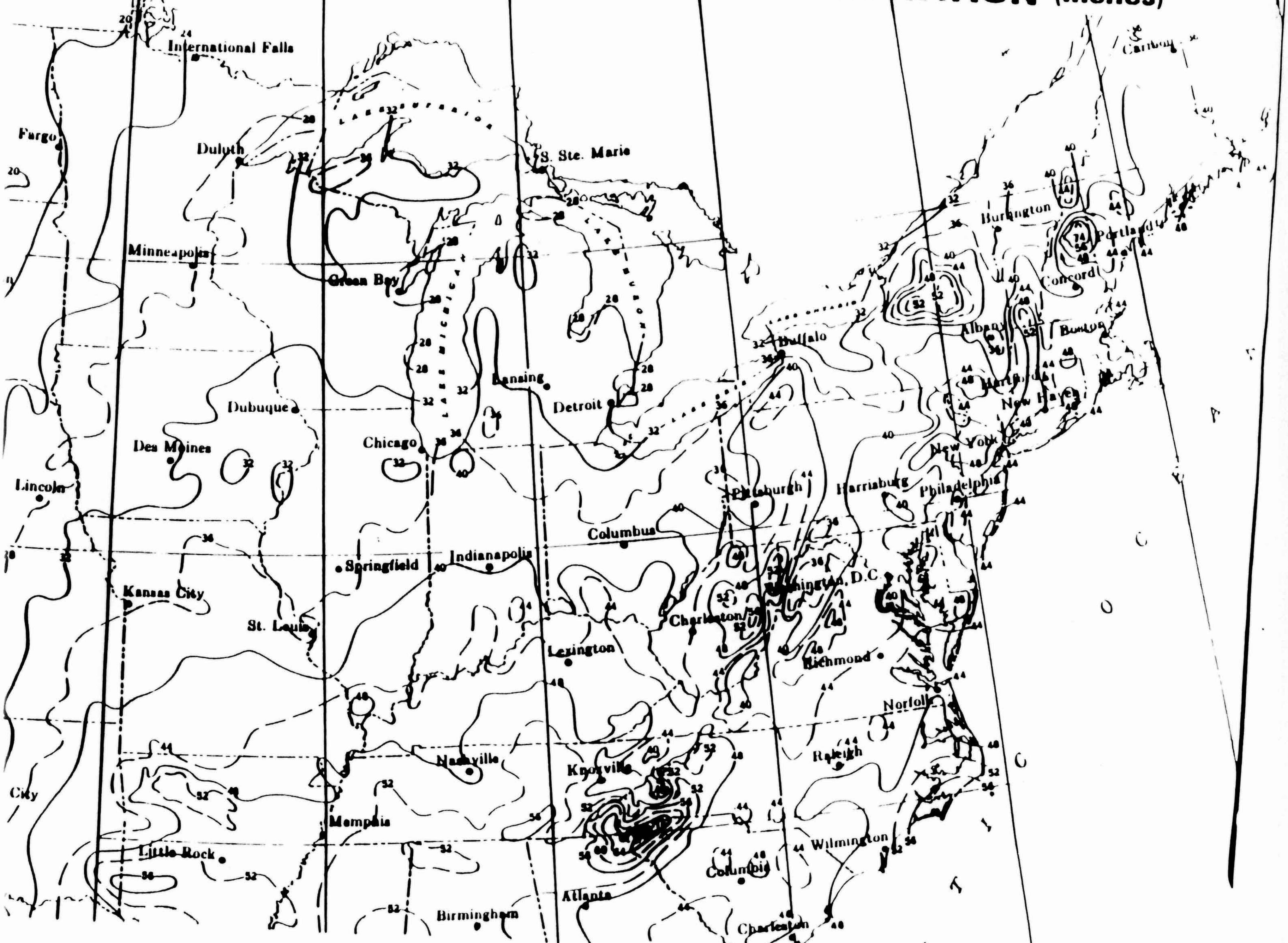
United States
Environmental Protection
Agency

1984

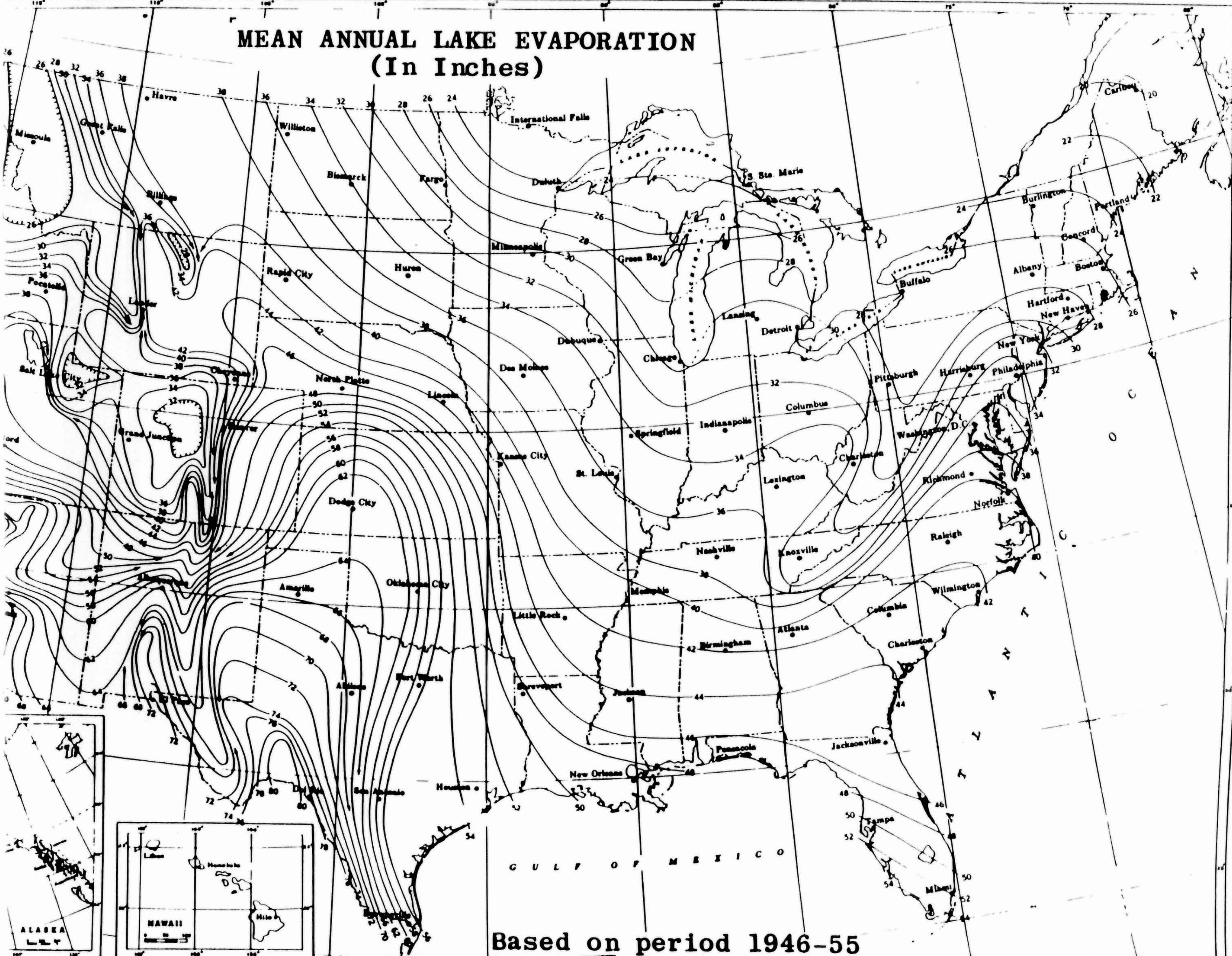
1 YEAR 24-HOUR RAINFALL (inches)



NORMAL ANNUAL TOTAL PRECIPITATION (Inches)



MEAN ANNUAL LAKE EVAPORATION
(In Inches)



Based on period 1946-55

TABLE 2

PERMEABILITY OF GEOLOGIC MATERIALS*

Type of Material	Approximate Range of Hydraulic Conductivity	Assigned Value
Clay, compact till, shale; unfractured metamorphic and igneous rocks	$<10^{-7}$ cm/sec	0
Silt, loess, silty clays, silty loams, clay loams; less permeable limestone, dolomites, and sandstone; moderately permeable till	10^{-5} - 10^{-7} cm/sec	1
Fine sand and silty sand; sandy loams; loamy sands; moderately permeable limestone, dolomites, and sandstone (no karst); moderately fractured igneous and metamorphic rocks, some coarse till	10^{-3} - 10^{-5} cm/sec	2
Gravel, sand; highly fractured igneous and metamorphic rocks; permeable basalt and lavas; karst limestone and dolomite	$>10^{-3}$ cm/sec	3

*Derived from:

Davis, S. N., <u>Porosity and Permeability of Natural Materials in Flow-Through Porous Media</u>, R.J.M. DeWiest ed., Academic Press, New York, 1969

Freeze, R.A. and J.A. Cherry, <u>Groundwater</u>, Prentice-Hall, Inc., New York, 1979

REFERENCE NO. 12

NUS CORPORATION AND SUBSIDIARIES

TELECON NOTE

CONTROL NO: 02 [illegible]-07

DATE: 2 27 89

TIME: 1035

DISTRIBUTION:

file Zamelsky Scrap

BETWEEN: Ms James

OF: Newark City Water Dept

PHONE: (201) 256-4965

AND: David Heim (NUS)

DISCUSSION:

Most of the City of Newark draws its drinking water from the Pequannock watershed which is a system of five reservoirs. However the south side of Newark, where Zamelsky is located, is served by the Wanaque Reservoir. All of these reservoirs are located in northern Passaic County

David Heim 2 27 89

ACTION ITEMS:

NUS 087 REVISED 0685

REFERENCE NO. 13

NUS CORPORATION AND SUBSIDIARIES

CONTROL NO: [illegible] - 01

TELECON NO

DATE: 04-20-88

TIME: 1400

DISTRIBUTION: SCP

BETWEEN: Mr Melito

OF: Essex [illegible] Public work engineer

PHONE: (201) 226 4500

AND: Richard Pasome

DISCUSSION:

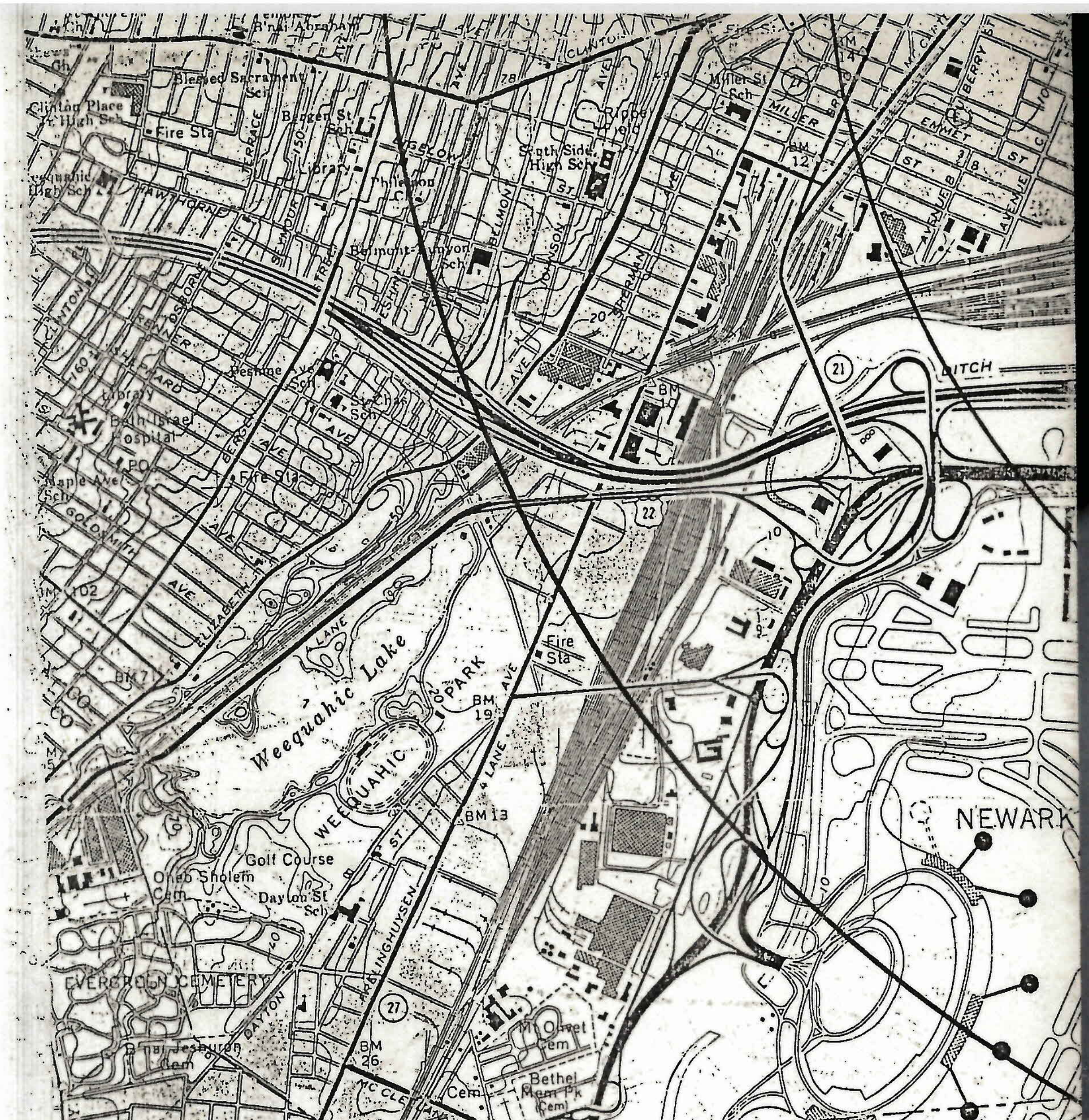
Mr Melito informed me that to his knowledge there are no drinking water wells in the whole city of Newark.

ACTION ITEMS:

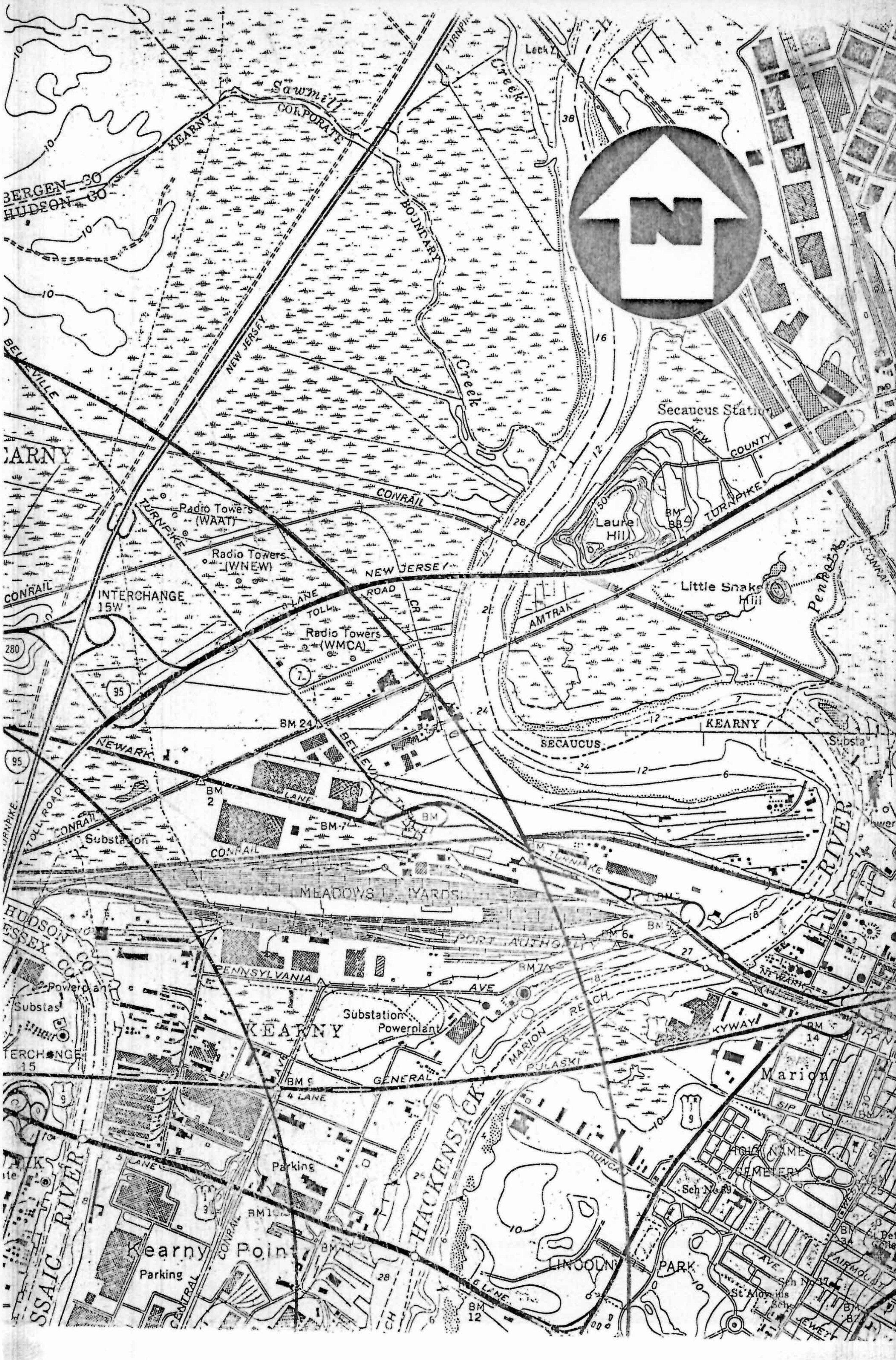
REFERENCE NO. 14

NUS CORPORATION	TITLE: THREE MILE VICINITY MAP	
	SITE : COOK AND DUNN PAINT CORP. NEWARK, N.J.	
DATE : 05/18/89		
TDD : 02-8904-11		
QUAD : ELIZABETH, N.J.	FIGURE NUMBER:	SCALE: 1"= 2000'

Mt Carmel Sch
St Pauls Ch
Fire Sta
SOUTH
CONRAIL
Yard
TOLL ROAD
Oak Island
Junction
TURNPIKE
WILSON
AVE
AVENUE
Sewage Disposal
Oak Island
Yards
Tollgate
Parking
PORT
INTERCHANGE 14
Garden
Yards
NEW JERSEY TURNPIKE
EXTENSION
DOREMUS
TRANSIT
ST
LANE
PORT NEWARK CHANNEL
NEW JERSEY
Radio
Towers
Port
Newark
TERMINAL
ELIZABETH CHANNEL
Tidal
Flat
NORTH REACH
REACH
ESSEX
UNION
CO
CO
HUDSON
CO
Light
BAY
STREET
Veterans
Park
SCALE 1:24 000
1 MILE
1000
0
1000
2000
3000
4000
5000
6000
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 10 FEET



Clinton Place Jr High Sch
Fire Sta
Weequahic High Sch
Blessed Sacrament Sch
Bergen St Sch
Library
Philemon Ch
Belmont-Runyon Sch
South Side High Sch
Miller St Sch
Peshine Ave Sch
St Chas Sch
Beth Israel Hospital
PO
Maple Ave Sch
DITCH
Weequahic Lake
WEEQUAHIC
PARK
Golf Course
Oheb Sholem Cem
Dayton St Sch
EVERGREEN CEMETERY
Mt Olivet Cem
Bethel Mem Pk (Cem)
Rosemont Mem Pk (Cem)
Eaton Mem Home
Radio Tower
NEWARK
St Catherines Sch
Wilson Park
Robert Morris Sch
Crane Sq
Kellogg Park
Monroe-Madison Sch
Evangel Ch
Blessed Sacrament Ch
Madison Ave Ch
Jr High Sch No 3
Jefferson Park
Armory
FRELINGHUYSEN
NORTH
EAST
DIVISION



Sawmill
KEARNY
CORPORATE
BOUNDARY
BERGEN CO
HUDSON CO
Creek
NEW JERSEY
TURNPIKE
Secaucus Station
NEW COUNTY
Laurel Hill
Little Snake Hill
Penhorn
KEARNY
CONRAIL
Radio Towers (WAAT)
Radio Towers (WNEW)
Radio Towers (WMCA)
INTERCHANGE 15W
NEW JERSEY
TOLL ROAD
AMTRAK
SECAUCUS
KEARNY
NEWARK
BELLEVILLE
Substation
MEADOWS YARDS
PORT AUTHORITY
PENNSYLVANIA AVE
HUDSON CO
ESSEX CO
Powerplant
Substas
KEARNY
Substation
Powerplant
MARION REACH
PULASKI SKYWAY
GENERAL
INTERCHANGE 15
Marion
HOLY NAME CEMETERY
HACKENSACK
PASSAIC RIVER
Parking
Kearny Point
Parking
CENTRAL
LINCOLN PARK
St Aloysius
RIVER

Ridge St Sch
St Pauls Ch
Fire Station
Elliott St Sch
Water
Roosevelt Sch
Arlington
Schuyler Sch
St Johns Ch
PASSAIC
St Anthonys Orphanage
ESSEX CO
HUDSON CO
New Jersey Boystown
St Stephens Sch
Arlington Memorial Park (Cemetery)
Summer Pl Sch
Mt Pleasant Ch
Sacred Heart Ch
KEARNY
Oakwood Ave Sch
Garfield Sch
Mount Pleasant Cem
Town Hall
Kearny Playground
CONRAIL
High Sch
Home for Foster Care
BROADWAY
BERGEN
West Hudson Hospital
Sacred Heart Inst
Gasoline
Radar Tower
Washington Sch
Franklin Sch
McKinley Sch
MILITARY RESERVATION
West Hudson Park
Webster High Sch
East Newark
HARRISON
KEARNY
High Sch
Library
Fire Sta
HARRISON REACH
HUDSON CO
ESSEX CO
Military Park
St Johns Ch
RIVER
Hayes Park
River Bank Park
S Market St Sch
CENTRAL RR OF NEW JERSEY
Hawkins Sch
INTERCHANGE 15E
SKYWAY
Lafayette Sch
St James Sch
Hosp
Library
Wilson Ave Sch
Drive-in Theater
Oliver St Sch
St Benedicts Sch
East Side

EAST ORANGE
NEWARK
UPSALA COLLEGE
Scott High Sch
INTERCHANGE 146 & 147
Carteret Sch
Shiloh Ch
Columbus Hosp
BRANCH BROOK
Abington Ave Sch
City Stadium
Ashland Sch
Columbian Sch
St Marys Cem
1st Ave Sch
Girls Voc Sch
Arlington Ave Sch
Mount Pleasant Cem
Mt Pleasant Ch
Summer Pl Sch
St Johns Ch
Ridge St Sch
St Pauls Ch
Fire Station
Elliott St Sch
Our Lady Help of Christians Sch
High Sch
Armory
Baptist Home for Aged
Garfield Sch
Stockton Sch
Orange Oval
Branch Brook Sch
Summer Ave Sch
Home for Foster Care
State Teachers College
Barringer High Sch
Sacred Heart Cathedral
Franklin Sch
Old Age Home
Nassau Sch
Tollgates
INTERCHANGES 145 AND 145A
Lincoln Sch
Newark Academy
McKinney Sch
Webster Jr High Sch
Holy Sepulchre Cem
Presbyterian Hospital
Branch Brook Park
East Newark
Fairmount Cemetery
County Jail
St Michaels Hospital
Barnet Sch
Library
Museum
Park
Speedway Sch
West Side High Sch
Newark Col of Eng
Rutgers Univ Newark Campus
Military Park
St Johns Ch
HUDSON CO
ESSEX CO
PASSAIC
Treat Sch
Courthouse
INTERCHANGE 144
15th Ave Sch
St Annes Sch
Camden Sch
Arts High Sch
West Side Park
Morton St Sch
City Hall
Fire Sta
West Kinney Jr High Sch
Cleveland Sch
Quitman St Sch
Montgomery Sch
18th Ave Sch
Woodland Ave Sch
Woodland Cemetery
Fire Sta
Madison Sch
Lincoln Park
Oliver St Sch
Hosp

REFERENCE NO. 15

NUS CORPORATION AND SUBSIDIARIES

TELECON NOTE

CONTROL NO: 02-8904-04-PA

DATE: 4/25/89

TIME: 1440

DISTRIBUTION:

File - Crumpton & Knowles Corporation

BETWEEN: Anthony Debarros

OF: Newark Water Department (Engineering Dept)

PHONE: (201) 256-4965

AND: Dennis Foerster - NUS Corp.

DISCUSSION:

Mr. Debarros informed me that the Passaic River has no apparent use in the Newark area. When I [redacted] DJF [redacted] DJF [redacted] asked if it was used for industrial purposes, he informed me to the best of his knowledge, DJF it wasn't even used for industrial purposes. He also informed me that the Weequahic Lake was used only in the event of drought emergencies.

Dennis J Foerster

ACTION ITEMS:

NUS 067 REVISED 0686

REFERENCE NO. 16

SEDIMENTOLOGY OF NEWARK BAY, NEW JERSEY:

AN URBAN ESTUARINE BAY

BY

Dennis John Suszkowski

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Marine Studies.

June, 1978

tugs. In the Kill Van Kull, Newark Bay, and the Hackensack and Passaic Rivers, the U.S. Army Corps of Engineers maintains approximately 35 kilometers of navigation channels

Since the Newark Bay region is extremely populated and heavily industrialized, it has only been natural that the waters of this region be used for industrial and municipal waste disposal. Leighton (1902) stated that the natural resources of the Passaic River were severely damaged due to water pollution 75 years ago. Suszkowski (1973) showed that dissolved oxygen levels in all sections of New York Harbor declined dramatically at the turn of the century due to the increased organic loadings of a growing populous. Mueller et al.(1976) indicate that at present, Newark Bay and the Hackensack and Passaic Rivers receive discharges of domestic and industrial wastewater amounting to 6.6 m^3/sec. This is approximately 13% of the total fresh water input into Newark Bay.

REFERENCE NO. 17

Newark

N. J.—N. Y.—PA.

1:250 000-scale map of

Atlantic Coast Ecological Inventory

Produced by
U. S. FISH AND WILDLIFE SERVICE
1980

er (S)

eron (S)
eron
(S)
S)
d (S)

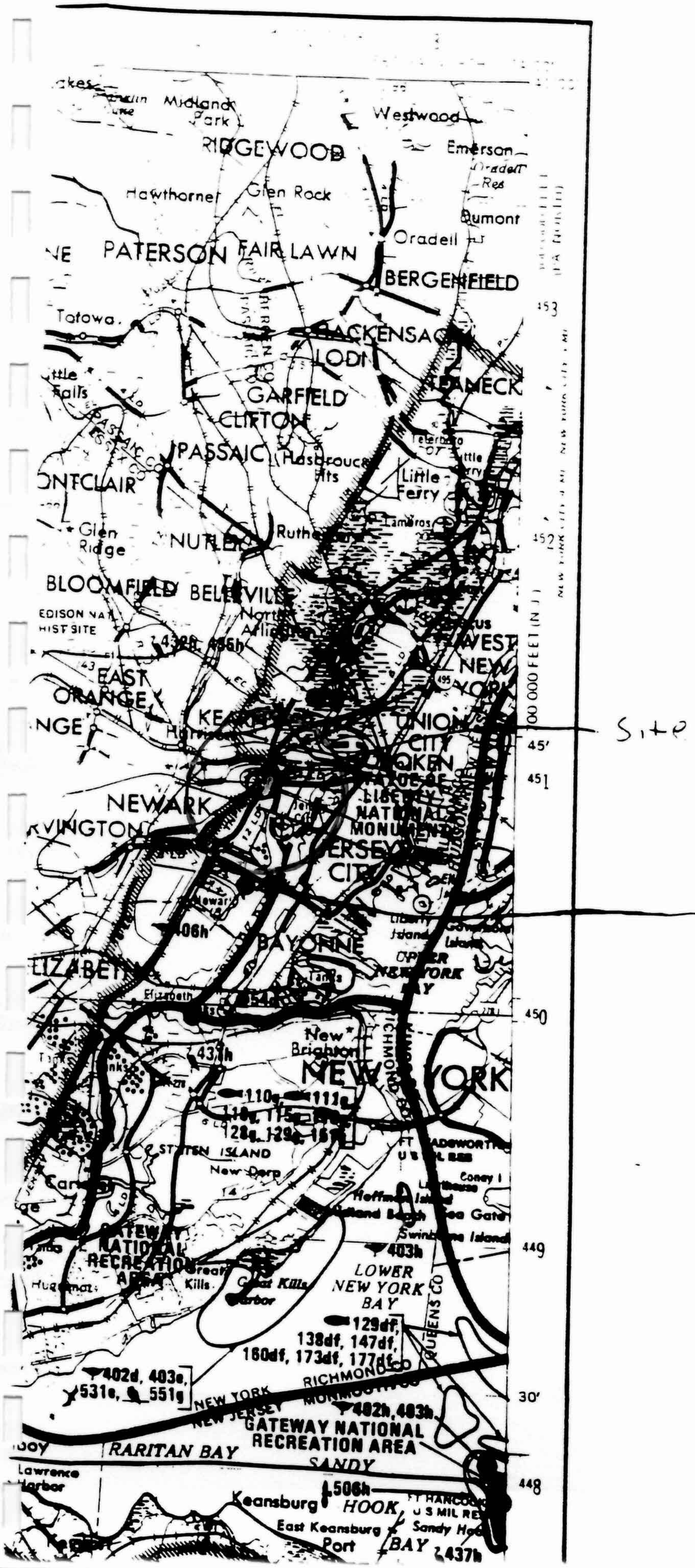
AQUATIC ORGANISMS

Shown in BLUE: species with special status shown in RED (F) or (S) indicates species protected by Federal or State Legislation (see text)

SYMBOL SPECIES

PLANTS (1-50)
1 Irish moss
2 Rockweed

INVERTEBRATES (51-100)
51 Crabs
52 Mussels
53 Oysters
54 Scallops
55 Clams
56 Worms
57 Shrimp
58 American lobster
59 Blue crab
60 Eastern oyster
61 European oyster
62 Bay scallop
63 Deep-sea scallop
64 Calico scallop
65 Surf clam
66 Hard clam
67 Soft shell clam



TERRESTRIAL [illegible]

SYMBOL SPECIES

PLANTS

[illegible]
[illegible] Spleenwort
[illegible]
[illegible]
[illegible]
[illegible] Hooded pitcher [illegible] tree
[illegible]8 Prickly pear cactus [illegible]
[illegible] Trailing arbutus [illegible]
[illegible] Eastern bumelia
[illegible] Pitcher plant
[illegible] Baldcypress
[illegible] Redbay
[illegible] Seaside alder
[illegible] Box huckleberry
[illegible] Purple fringeless orchid
[illegible] Pink lady's slipper
[illegible]8 Ebony spleenwort [illegible]
319 Orchids [illegible]
320 Golden club [illegible]
321 Florida beargrass
322 East-coast coontie
323 Fall-flowering ixia
324 Jackson-vine
325 Spoon-flower
326 Curtiss milkweed
327 Sea lavender
328 Hand fern
329 Needle palm
330 Yellow squirrel-banana
331 Beach creeper
332 Florida coontie
333 Four-petal pawpaw
334 Bird's nest spleenwort
335 Burrowing four-o'clock
336 Beach star
337 Silver palm
338 Dancing lady orchid
339 Tamarindillo
340 Fuch's bromeliad
341 Everglades peperomia
342 Buccaneer palm
343 Slender spleenwort
344 Pineland jacquemontia
345 Mahogany mistletoe
346 Florida thatch
347 Twisted air plant
348 Long's bittercress
349 Venus's flytrap

INVERTEBRATES (351-400)

351 Monarch butterfly
352 Zebra butterfly

BIRDS (401-600)

SHOREBIRDS (401-430)

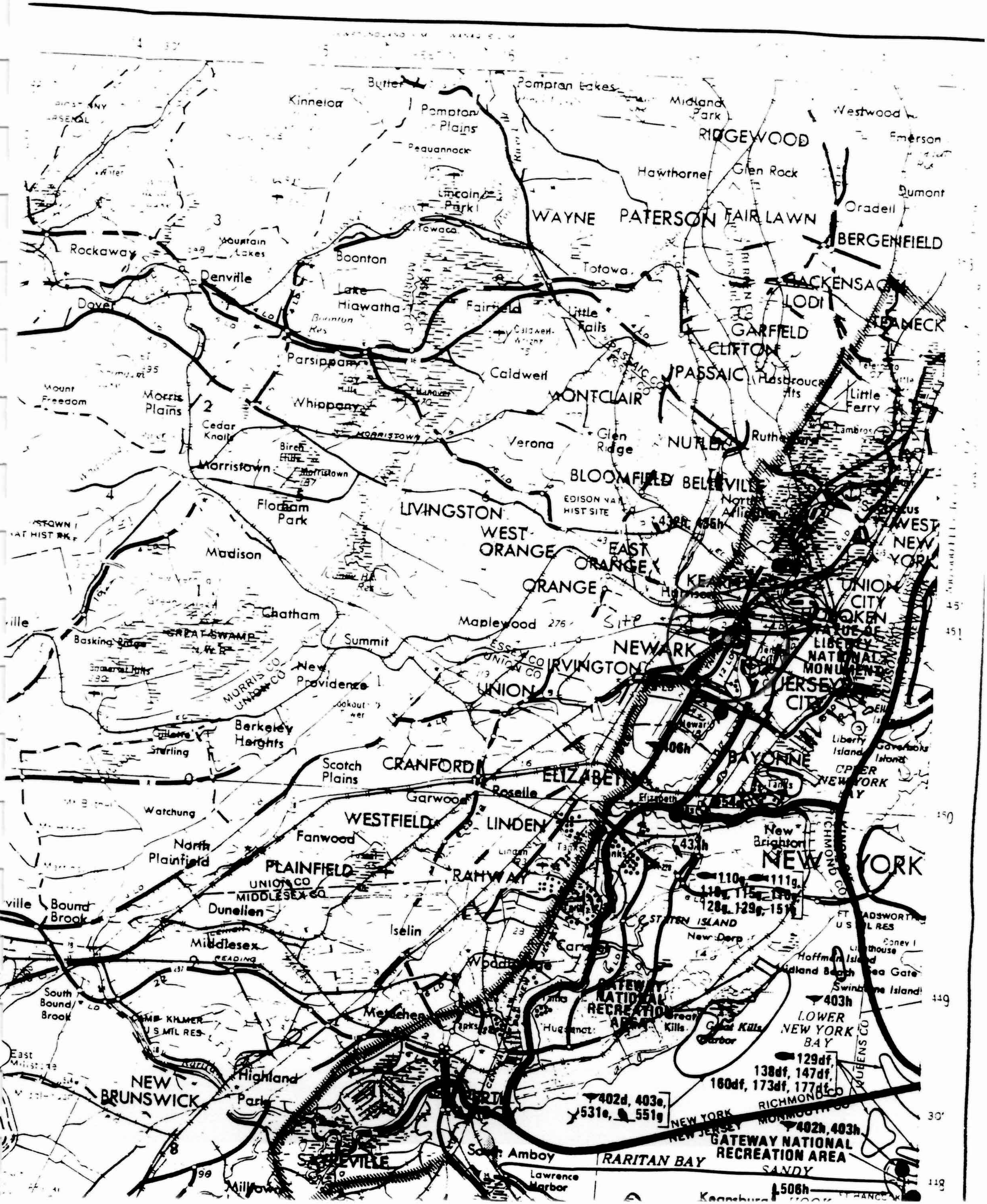
401 Shorebirds
402 Terns
403 Gulls
404 Forster's tern
405 Arctic tern
406 Least tern (S)
407 Roseate tern (S)
408 Common tern
409 Great black-backed gull
410 Herring gull
411 Laughing gull
412 Black skimmer (S)
413 Turnstones
414 Plovers
415 Piping plover
416 American oystercatcher (S)

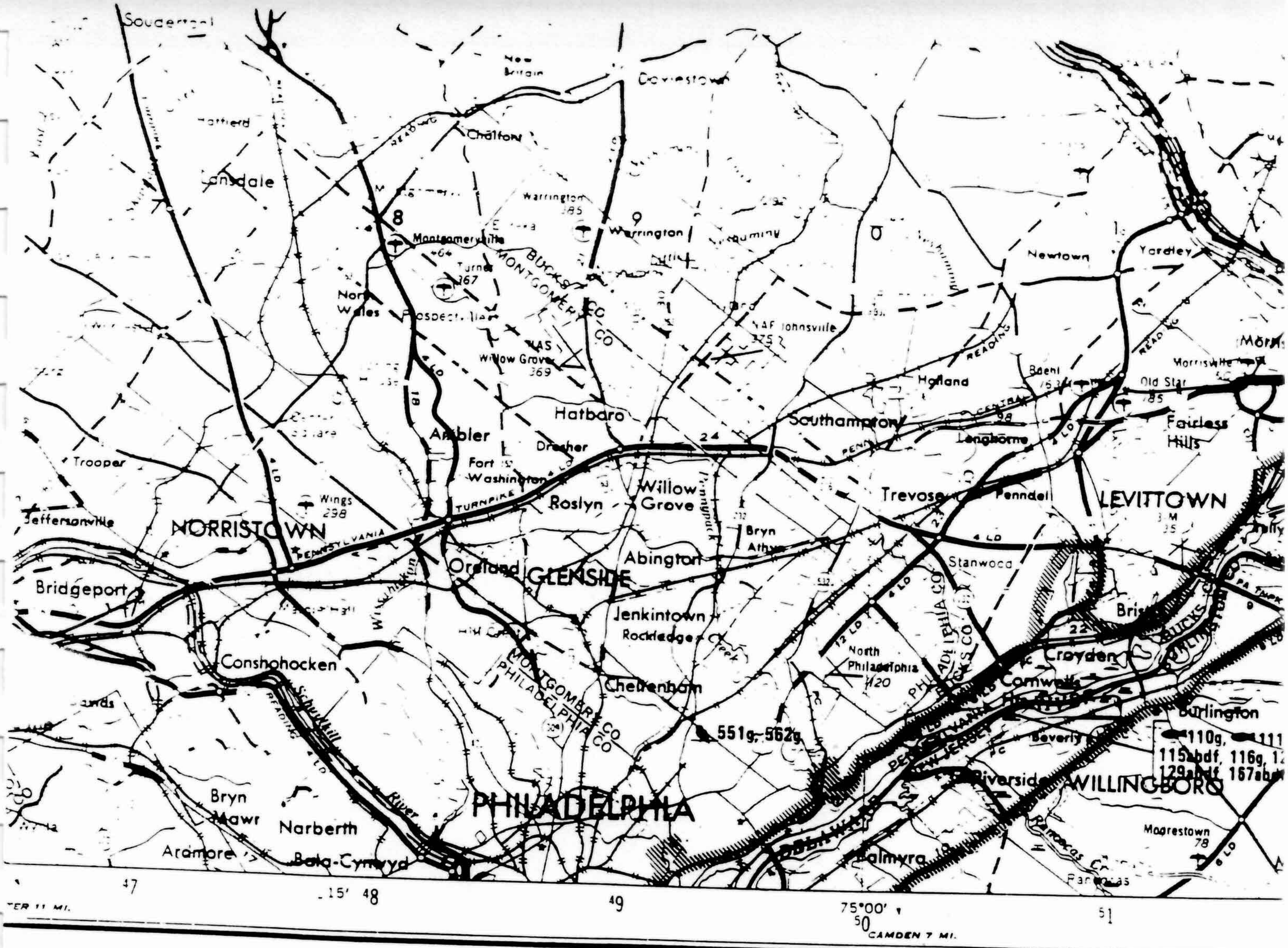
WADING BIRDS (431-460)

431 Wading birds
432 Herons
433 Egrets
434 Rails
435 Ibises
436 Bitterns
437 Great blue heron (S)
438 Wood ibis (S)
439 Anhinga
440 Little blue heron (S)
441 Yellow-crowned night heron (S)
442 Black-crowned night heron
443 Florida sandhill crane (S)
444 Louisiana heron (S)
445 Limpkin (S)
446 Roseate spoonbill (S)
447 Snowy egret (S)
448 Magnificent frigate-bird (S)
449 Reddish egret (S)
450 Clapper rail
451 King rail
452 Virginia rail
453 Sora rail

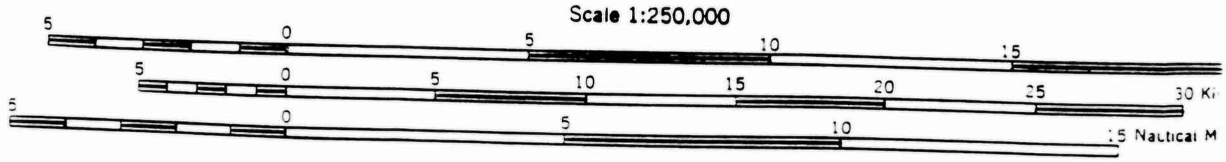
WATERFOWL (461-500)

461 Waterfowl
462 Swans
463 Geese
464 Dabbling ducks
465 Diving ducks
466 Common eider
467 Harlequin duck
468 Wood duck
469 Fulvous tree duck


Butler
Pompton Lakes
Midland Park
Westwood
Kinnelon
Pompton Plains
RIDGEWOOD
Emerson
Pequannock
Hawthorne
Glen Rock
Dumont
Lincoln Park
Oradell
WAYNE
PATERSON
FAIR LAWN
BERGENFIELD
Towaco
Rockaway
Mountain Lakes
Boonton
Totowa
Denville
HACKENSACK
LODI
Dover
Lake Hiawatha
Boonton Res
Fairfield
Little Falls
GARFIELD
TEANECK
CLIFTON
Parsippany
Caldwell
PASSAIC
Hasbrouck Hts
Mount Freedom
Morris Plains
Whippany
MONTCLAIR
Little Ferry
Cedar Knolls
Verona
Glen Ridge
NUTLEY
Rutherford
Morristown
BLOOMFIELD
BELLEVILLE
North Arlington
Florham Park
LIVINGSTON
EDISON NAT HIST SITE
WEST ORANGE
EAST ORANGE
Madison
ORANGE
KEARNY
UNION CITY
Harrison
Chatham
Maplewood
Site
HOBOKEN
Basking Ridge
GREAT SWAMP
Summit
NEWARK
STATUE OF LIBERTY NATIONAL MONUMENT
IRVINGTON
ESSEX CO
UNION CO
MORRIS CO
UNION CO
New Providence
UNION
JERSEY CITY
Berkeley Heights
Sterling
Liberty Island
Governors Island
Scotch Plains
CRANFORD
ELIZABETH
BAYONNE
UPPER NEW YORK BAY
Roselle
Garwood
Watchung
WESTFIELD
LINDEN
New Brighton
Fanwood
North Plainfield
NEW YORK
PLAINFIELD
RAHWAY
UNION CO
MIDDLESEX CO
Bound Brook
Dunellen
STATEN ISLAND
Iselin
FT WADSWORTH US MIL RES
New Dorp
Middlesex
Hoffman Island
Midland Beach
Sea Gate
South Bound Brook
Swinburne Island
CAMP KILMER US MIL RES
Metuchen
GATEWAY NATIONAL RECREATION AREA
Huguenot
Great Kills
Great Kills Harbor
LOWER NEW YORK BAY
East Millstone
Highland Park
NEW BRUNSWICK
RICHMOND CO
NEW YORK
NEW JERSEY
MONMOUTH CO
GATEWAY NATIONAL RECREATION AREA
SAYREVILLE
South Amboy
RARITAN BAY
Lawrence Harbor
Keansburg
Milltown
433h
406h
110g, 111g, 118g, 115g, 130g, 128g, 129g, 151g
403h
129df, 138df, 147df, 160df, 173df, 177df
402d, 403e, 531e, 551g
402h, 403h
506h



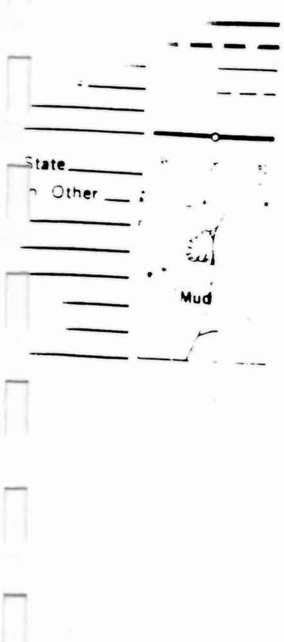
Scale 1:250,000



TRANSVERSE MERCATOR PROJECTION

BLACK NUMBERED LINES INDICATE THE 10,000 METER UNIVERSAL TRANSVERSE MERCATOR GRID, ZONE 18

FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092, OR DENVER, COLORADO 80225



REFERENCE NO. 18

Surface Water Quality Standards

SURFACE WATER QUALITY STANDARDS

N.J.A.C. 7:9-4.1 et seq.

May 1985

New Jersey Department of Environmental Protect

(Stockholm) - Brook between Hamburg Turnpike and Williamsville-Stockholm Rd. to its confluence with Lake Stockholm Brook, north of Rt. 23	FW1 (tm)
LITTLE POND BROOK (Oakland) - Entire length	FW2-TP(C1)
LOANTAKA BROOK	
(Green Village) - Entire length, except segment described below	FW2-NT
(Great Swamp) - Brook and all tributaries within the boundaries of Great Swamp National Wildlife Refuge	FW2-NT(C1)
LUD-DAY BROOK	
(Camp Garfield) - Source to confluence with a tributary from Camp Garfield	FW1
MACOPIN RIVER	
(Newfoundland) - Source to Echo Lake dam	FW2-NT
(Newfoundland) - Echo Lake dam to Pequannock River	FW2-TM
MEADOW BROOK (Wanaque) - Skyline Lake to Wanaque River	FW2-NT
MILL BROOK	
(Randolph) - Source to Rt. 10 bridge	FW2-TP(C1)
(Randolph) - Rt. 10 bridge to Rockaway River	FW2-NT
MORSES CREEK - Entire length	FW2-NT/SE3
MOSSMAN'S BROOK - See CLINTON BROOK	
MT. TABOR BROOK (Morris Plains) - Entire length	FW2-NT
NEWARK BAY (Newark) - North of an east-west line connecting Elizabethport with Bergen Pt., Bayonne up to the mouths of the Passaic and Hackensack Rivers	SE3
NOSENZO POND (Upper Macopin)	FW2-NT(C1)
OAK RIDGE RESERVOIR (Oak Ridge)	FW2-TM
OAK RIDGE RESERVOIR (Oak Ridge) - Northwestern tributary to Reservoir	FW1 (tm)
OVERPECK CREEK (Palisades Park) - Entire length	FW2-NT/SE2
PECKMAN RIVER (Verona) - Entire length	FW2-NT
PACACK BROOK	
(Stockholm) - Source to Pequannock River, excluding Canistear Reservoir, except segments described separately below	FW2-NT
(Canistear) - Brook and tributaries upstream of Canistear Reservoir located entirely within the boundaries of the Newark Watershed	FW1
PASSAIC RIVER	
(Mendham) - Source to Rt. 202 bridge (Van Doren's Mill), except tributaries described separately below	FW2-TM
(Paterson) - Rt. 202 bridge to Dundee Lake dam	FW2-NT
(Little Falls) - Dundee Lake dam to confluence with Second River	FW2-NT/SE2
(Newark) - Confluence with Second River to mouth	SE3

(c) In all FW2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary and secondary contact recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after such treatment as required by law or regulation; and
5. Any other reasonable uses.

(d) In all SE1 waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;
2. Maintenance, migration and propagation of the natural and established biota;
3. Primary and secondary contact recreation; and
4. Any other reasonable uses.

(e) In all SE2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Migration of diadromous fish;
3. Maintenance of wildlife;
4. Secondary contact recreation; and
5. Any other reasonable uses.

(f) In all SE3 waters the designated uses are:

1. Secondary contact recreation;
2. Maintenance and migration of fish populations;
3. Migration of diadromous fish;
4. Maintenance of wildlife; and
5. Any other reasonable uses.

(g) In all SC waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;

REFERENCE NO. 19

GEMS> I

COOK AND DUNN PAINT CORP.
LATITUDE 40:43:33 LONGITUDE 74: 8:20 1980 POPULATION

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	0	6216	14861	39248	118596	286538	465459
RING TOTALS	0	6216	14861	39248	118596	286538	465459

GEMS> I

COOK AND DUNN PAINT CORP.
LATITUDE 40:43:33 LONGITUDE 74: 8:20 1980 HOUSING

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	0	2013	4962	13761	41707	97945	160388
RING TOTALS	0	2013	4962	13761	41707	97945	160388

# miles from site	Population	Housing
1	21,077	6,975
2	60,325	20,736
3	178,921	62,443
4	465,459	160,388

REFERENCE NO. 20

NUS CORPORATION TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8904-11	June 6, 1989	1110

DISTRIBUTION:

Cook and Dunn Paint Corp. - File

BETWEEN:	OF:	PHONE:
Bob Shaffery	Newark Surveyor's office	(201) 733-6569

AND:

Dennis Foerter, NUS Corp. (NUS)

DISCUSSION:

I asked Mr. Shaffery who owned the property on 167 Kossuth Street. He said Ridge Equities Corp. owned the property since April 19, 1984. The address of Ridge Equities is 443 Ridgewood Avenue Glen Ridge, NJ 07028. He did not have the telephone number

Dennis J Foerter
6/6/89

ACTION ITEMS:

NUS 087 REVISED 0681

REFERENCE NO. 21

Dangerous Properties of Industrial Materials

Fifth Edition

N. IRVING SAX

Assisted by:

Marilyn C. Bracken/Robert D. Bruce/William F. Durham/Benjamin Feiner/
Edward G. Fitzgerald/Joseph J. Fitzgerald/Barbara J. Goldsmith/John H. Harley/
Robert Herrick/Richard J. Lewis/James R. Mahoney/John F. Schmutz/
E. June Thompson/Elizabeth K. Weisburger/David Gordon Wilson

VNR VAN NOSTRAND REINHOLD COMPANY
NEW YORK CINCINNATI TORONTO LONDON MELBOURNE

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T33.3.H3S3 1979 604'.7 78-20812
ISBN 0-442-27373-8

cutaneous injection of phenyl hydrazine has been shown to cause hemolysis of the red blood cells, an effect which has been utilized in the treatment of polycythemia. The erythrocytes frequently contain Heinz bodies. Part of the hemoglobin is converted to methemoglobin. Pathological changes seen in animals include congestion of the spleen with hyperplasia of the reticuloendothelial system, degeneration and necrosis of the liver cells with extensive pigmentation, early damage to the tubules of the kidneys with fatty changes in the cortical portion, and hyperplasia of the bone marrow. The most common effect of occupational exposure is the development of dermatitis which, in sensitized persons, may be quite severe. Systemic effects include anemia and general weakness, gastrointestinal disturbances and injury to the kidneys.

Fire Hazard: Mod, when exposed to heat, flame or oxidizers; reacts violently with PbO_2. [*19*]

Disaster Hazard: Dangerous; when heated to decomp, emits highly toxic fumes of nitrogen compounds; can react with oxidizing materials.

To Fight Fire: Alcohol foam.

PHENYLHYDRAZINE HYDROCHLORIDE. Leaflets. $C_6H_5NHNH_2 \cdot HCl$, mw: 144.6, mp: 245°.

THR = An exper neo. [*3*] See also phenyl hydrazine.

Disaster Hazard: Dangerous; when heated to decomp, emits toxic fumes of nitrogen compounds and chlorides.

PHENYL HYDRIDE. See benzene.

PHENYLHYDROXYACETIC ACID. See mandelic acid.

***m*-PHENYL HYDROXYLAMINE HYDROCHLORIDE.** $C_6H_5NHOH \cdot HCl$, mw: 145.6.

THR = Can explode spont. [*19*]

PHENYL-α-HYDROXYBENZYL KETONE. See benzoin.

PHENYLIC ACID. See phenol.

PHENYLIMINOPHOSGENE. See phenyl carbylamine chloride.

PHENYL ISOCYANATE. Liquid, acrid odor. C_6H_5NCO, mw: 119.1, mp: −30° approx, bp: 166°, d: 1.1 @ 20°, vap. press: 1 mm @ 10.6°, flash p: 132°.

Acute tox data: Oral LD_{50} (rat) = 940 mg/kg. [*3*]

THR = MOD via oral route. An irr. It exploded when stirred with (cobalt pentammine triazoperchlorate + nitrosyl perchlorate). [*19*]

PHENYL ISOCYANIDE. See phenyl carbylamine.

PHENYL ISOTHIOCYANATE. See phenyl mustard oil.

PHENYL KETONE. See benzophenone.

PHENYLMAGNESIUM BROMIDE. A solid. C_6H_5MgBr, mw: 181.3.

THR = Probably HIGH. See also bromides and phenol.

Fire Hazard: Dangerous, by chemical reaction.

Explosion Hazard: Mod, by chemical reaction.

Disaster Hazard: Dangerous; will react with water, steam or acids to produce heat and toxic and flam vapors; can react vigorously with oxidizing materials; on decomp, emits toxic fumes of bromides.

To Fight Fire: CO_2, dry chemical.

PHENYLMAGNESIUM CHLORIDE. Crystals, sol in ether. C_6H_5MgCl, mw: 136.9.

THR = See grignard reagents.

N-PHENYLMALEAMIC ACID. Syn: *maleanilic acid.* Yellow crystalline solid. $C_{10}H_9O_3N$, mw: 191.18, mp: 190°, d: 1.418 @ 30°.

THR = Probably MOD irr and via inhal and oral routes.

Fire Hazard: Slight.

PHENYL MERCAPTAN. Syns: *thiophenol, benzenethiol.* Liquid, repulsive odor. C_6H_5SH, mw: 110.2, bp: 168.3°, d: 1.0728 @ 25°/4°.

THR = Can cause severe dermatitis and exposure is said to be capable of causing headache and dizziness; mosquito larvicide. See also mercaptans.

Fire Hazard: U.

Disaster Hazard: Dangerous; when heated to decomp, or on contact with acids, emits toxic fumes of sulfur compounds.

PHENYL MERCAPTOACETIC ACID. White powder. $C_6H_5SCH_2COOH$, mw: 168.2, mp: 63°.

THR = Details U; a fungicide and bactericide; probably HIGH toxicity. See also mercaptans.

Disaster Hazard: Dangerous; when heated to decomp, or on contact with acids, emits highly toxic fumes of SO_x.

PHENYLMERCURIC ACETATE. Lustrous crystals, slightly sol in water. $(C_6H_5)HgC_2H_3O_2$, mw: 336.8, mp: 149°.

Acute tox data: Oral LD_{50} (rat) = 30 mg/kg; ip LD_{50} (mouse) = 8 mg/kg; sc LD_{50} (mice) = 37 mg/kg. [*3*]

THR = HIGH via oral, ip and sc routes. A fungicide and herbicide. See mercury compounds, organic. An exper teratogen and neo via iv route. [*3*]

PHENYLMERCURIC ACETOXYDECANOIC ACID.

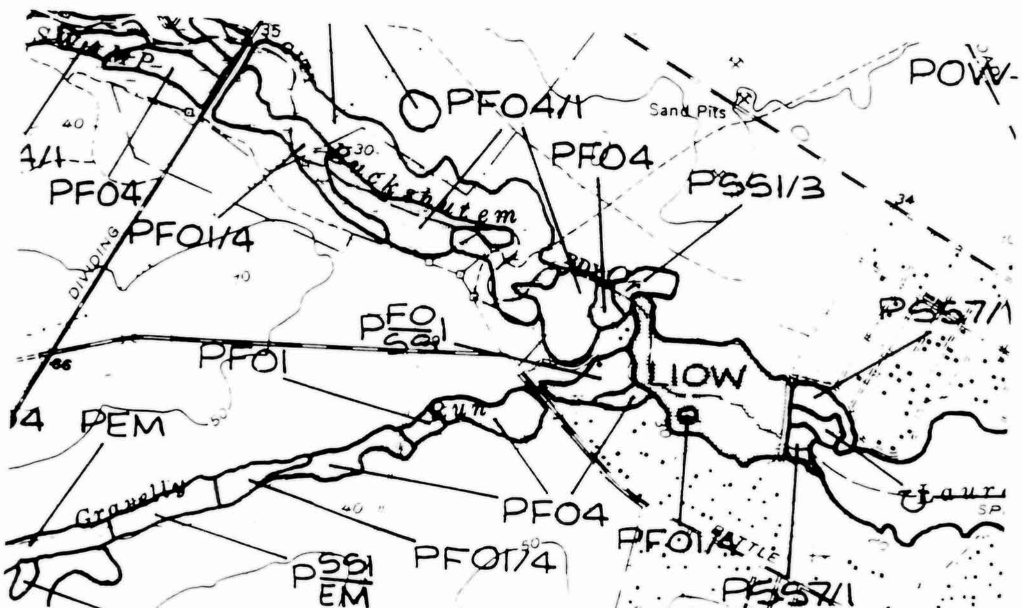
THR = A fungicide. See mercury compounds, organic.

PHENYLMERCURIC AMMONIUM ACETATE.

THR = A fungicide. See mercury compounds, organic.

REFERENCE NO. 22

ATLAS
OF
NATIONAL WETLANDS INVENTORY MAPS
FOR
NEW JERSEY



PORTION OF DIVIDING CREEK MAP

SCALE: 1:24.000

UNITED STATES
DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Region Five
Habitat Resources
One Gateway Center, Suite 700
Newton Corner, Massachusetts

1984

HOW TO USE THIS ATLAS

The Atlas contains reductions of all 1:24,000 National Wetlands Inventory maps. Maps appear in alphabetical order. Map names can be located on the index map (Figure 2). Each map shows the configuration, location and type of wetlands and deepwater habitats found within a given area.

WETLAND LEGEND

Wetland data are displayed on maps by a series of letters and numbers (alpha-numerics). Mixing of classes and subclasses are represented by a diagonal line. The more common symbols are shown below; less common symbols have been omitted for simplicity. For identifying these latter symbols, the reader should refer to an actual NWI map legend.

Examples of Alpha-numerics:

E2EMN6	=	Estuarine (E), Intertidal(2), Emergent Wetland(EM), Regularly Flooded(N), Oligohaline(6)
E2FL	=	Estuarine(E), Intertidal(2), Flat(FL)
PF01	=	Palustrine(P), Forested Wetland(FO), Broad-leaved Deciduous(1)
PEM/OW	=	Palustrine(P), Emergent Wetland/Open Water(EM/OW)
PFO/SS1	=	Palustrine(P), Forested Wetland/Scrub-Shrub Wetland(FO/SS), Broad-leaved Deceduous(1)

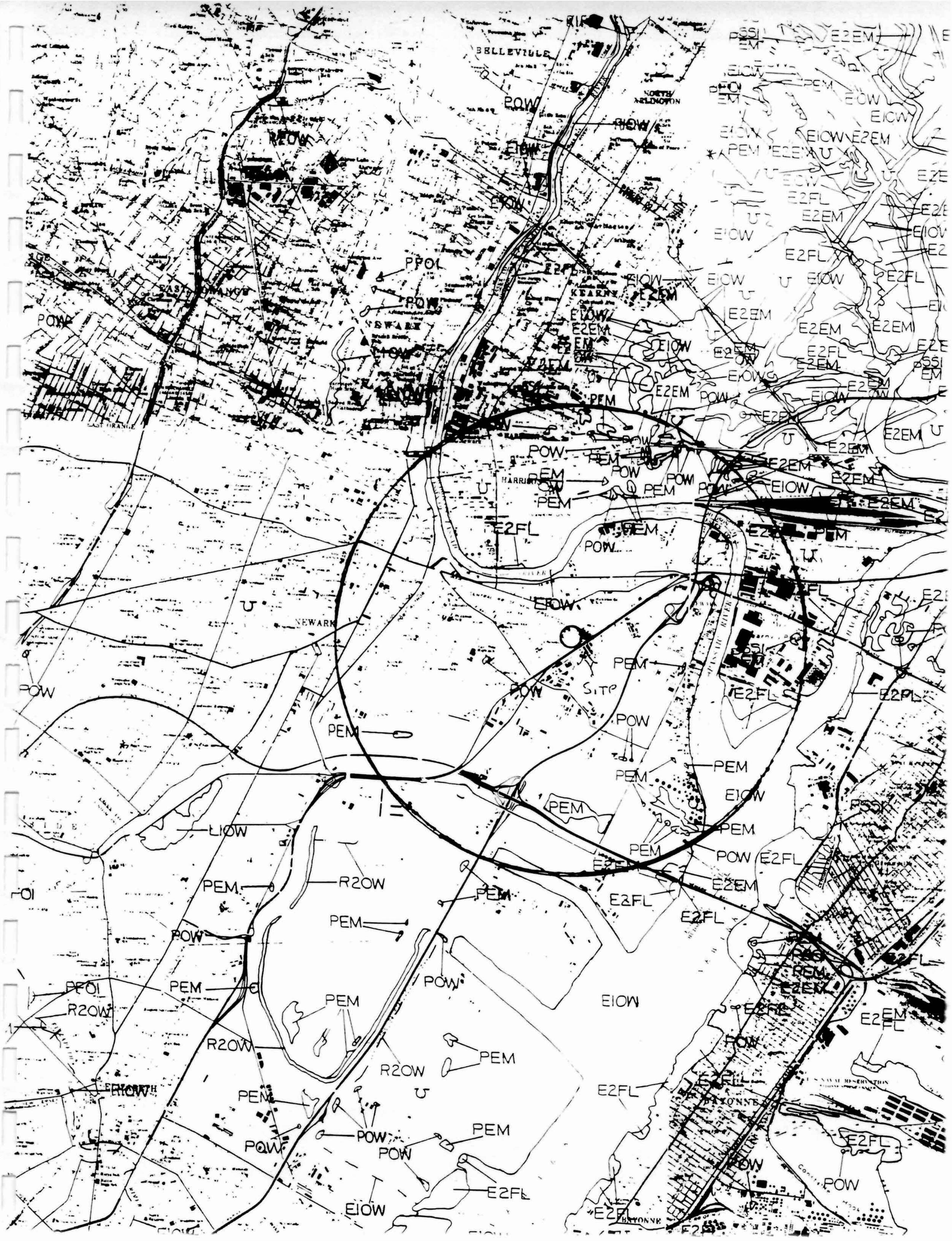
SYMBOLOGY

Systems and Subsystems:

M 1	=	Marine Subtidal
M 2	=	Marine Intertidal
E 1	=	Estuarine Subtidal
E 2	=	Estuarine Intertidal
R 1	=	Riverine Tidal
R 2	=	Riverine Lower Perennial
R 3	=	Riverine Upper Perennial
R 4	=	Riverine Intermittent
L 1	=	Lacustrine Limnetic
L 2	=	Lacustrine Littoral
P	=	Palustrine
U	=	Upland

Classes (subclasses and modifers designated where appropriate):

AB	=	Aquatic Bed
BB	=	Beach/Bar
EM	=	Emergent Wetland
EMN6	=	Emergent Wetland, Regularly Flooded, Oligohaline
EMP6	=	Emergent Wetland, Irregularly Flooded, Oligohaline
EMR	=	Emergent Wetland, Seasonally Flooded-Tidal
FL	=	Flat
FO1	=	Forested Wetland, Broad-leaved Deciduous
FO2	=	Forested Wetland, Needle-leaved Deciduous
FO4	=	Forested Wetland, Needle-leaved Evergreen
OW	=	Open Water/Unknown Bottom
SS1	=	Scrub=Shrub Wetland, Broad-leaved Deciduous
SS3	=	Scrub-Shrub Wetland, Broad-leaved Evergreen
SS4	=	Scrub-Shrub Wetland, Needle-leaved Evergreen
SS5	=	Scrub-Shrub Wetland, Dead
SS7	=	Scrub-Shrub Wetland, Evergreen



BELLEVILLE
NORTH ARLINGTON
KEARNY
NEWARK
EAST ORANGE
HARRISON
BAYONNE
Site
POW
PEM
E2EM
E2FL
E1OW
PFOl
R2OW
PSSl
U

REFERENCE NO. 23

HWDMS MASTER FACILITY LISTING

)/20/82

GION: 02 STATE: NJ NJD002154144 COOK & DUNN PAINT CORP L

167 KOSSUTH STREET

EXISTANCE DATE: 11/01/82 NEWARK NJ 07101 CL

201/589/5580

COUNTY: ESSEX 013 DISTRICT: BASIN: 810213 LATITUDE: 404333.0

ILITY STATUS: 1 MODIFY/CONSTRUCT: COMMERCIAL: NON-REGULATED: OWNER TYPE: P FACILITY TYPE:

MAILING ADDRESS	OWNER ADDRESS	OPERATOR A
UDYKOFF ARTHUR CHEMIST	COOK & DUNN PAINT CORP	COOK & DUNN P
67 KOSSUTH STREET	167 KOSSUTH STREET	167 KOSSUTH S
EWARK NJ 07101	NEWARK NJ 07101	NEWARK
	201/589-5580	201/589

INDICATORS	NOTIFICATION DATA	PERMITS
	PERMIT STATUS: 1	TYPE NUMBER
CONFIDENTIALITY NOTIF : 0	NOTIFICATION RECEIVED: 8/11/80	
CONFIDENTIALITY PART A : 0	NOTIFICATION ACKNOWLEDGED: 10/09/80	
NATURE BUSINESS IND : A	PART A RECEIVED: 11/19/80	
MAP STATUS IND : A	(1) PART A ACKNOWLEDGED: 1/15/81	
DRAWING STATUS IND : A	(2) PART A ACKNOWLEDGED:	
PHOTO STATUS IND : A		
INDIAN LAND IND : N		
OWNER/OPERATOR IND : Y		

SIC CODES TRANSPORTATION

DRESS | OWNER ADDRESS | OPERATOR ADDRESS
CHEMIST | COOK & DUNN PAINT CORP | COOK & DUNN PAINT CORP
EET | 167 KOSSUTH STREET | 167 KOSSUTH STREET
NJ 07101 | NEWARK | NJ 07101 | NEWARK | NJ 07
201/589-5580 | 201/589-5580

TORS | NOTIFICATION DATA | PERMITS | DESIGN CAPACITY

Y NOTIF : 0	PERMIT STATUS: 1	TYPE	NUMBER	PROCESS	AMOUNT
Y PART A : 0	NOTIFICATION RECEIVED: 8/11/80				
NESS IND : A	NOTIFICATION ACKNOWLEDGED: 10/09/80			S01	5500.0
ATUS IND : A	PART A RECEIVED: 11/19/80				
ATUS IND : A	(1) PART A ACKNOWLEDGED: 1/15/81				
ATUS IND : A	(2) PART A ACKNOWLEDGED:				
LAND IND : N					
ATOR IND : Y					

DES | TRANSPORTATION

WASTE DESCRIPTION

ESTIMATED AMOUNT:	4.536 MT	PROCESSES: S01
ESTIMATED AMOUNT:	331.128 MT	PROCESSES: S01
ESTIMATED AMOUNT:	MT	PROCESSES:
ESTIMATED AMOUNT:	2.268 MT	PROCESSES: S01
ESTIMATED AMOUNT:	MT	PROCESSES: S01

COMMENTS

157 820310 10.33814 W

REFERENCE NO. 24

NUS CORPORATION — TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8904-11-PA	June 9, 1989	1030

DISTRIBUTION:

Cook and Dunn Paint Corp. - File

BETWEEN:	OF:	PHONE:
MR. ALVI	City of Newark Engineering Dept.	(201) 669-3960

AND: Dennis Foerter, NUS Corp. (NUS)

DISCUSSION:

I asked MR. ALVI if there were storm drains in the area of Cook and Dunn Paint Corp. He said that there were storm drains, but it was difficult to determine where they discharged at.

Dennis Foerter
6/9/89

ACTION ITEMS:

NUS 067 REVISED 0681

THIS DOCUMENT IS CURRENTLY CLASSIFIED NON-CONFIDENTIAL BY EPA AS THE ~~ABOVE~~ SITE DOES NOT QUALIFY FOR FURTHER REMEDIAL ACTION AT THIS TIME

Cook and Dunn Paint

02-8904-11-2A

REV. NO. 0

CONFIDENTIAL–NOT FOR PUBLIC RELEASE

NJD002154144

HRS

	S	S^2
Groundwater Route Score (S_{gw})	0.00	0.00
Surface Water Route Score (S_{sw})	0.00	0.00
Air Route Score (S_a)	0.00	0.00
$S_{gw}^2 + S_{sw}^2 + S_a^2$		0.00
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		0.00
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		0.00

WORKSHEET FOR COMPUTING S_M

PRO

	S	S^2
Groundwater Route Score (S_{gw})	0.00	0.00
Surface Water Route Score (S_{sw})	0.00	0.00
Air Route Score (S_a)	0.00	0.00
$S_{gw}^2 + S_{sw}^2 + S_a^2$		0.00
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		0.00
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		0.00

WORKSHEET FOR COMPUTING S_M

HRS - 0
PRO - ☐

02-8904-11-PA
Rev. No. 0

CONFIDENTIAL-NOT FOR PUBLIC RELEASE

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	HRS	Max. Score	PRO
1 Observed Release	0 45	1	0	45	0
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					
Depth to Aquifer of Concern	0 1 2 3	2	6	6	6
Net Precipitation	0 1 2 3	1	2	3	2
Permeability of the Unsaturated Zone	0 1 2 3	1	2	3	2
Physical State	0 1 2 3	1	3	3	3
Total Route Characteristics Score			13	15	13
3 Containment	0 1 2 3	1	0	3	0
4 Waste Characteristics					
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	18
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8	1
Total Waste Characteristics Score			19	26	19
5 Targets					
Ground Water Use	0 1 2 3	3	3	9	3
Distance to Nearest Well/Population Served	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	0
Total Targets Score			3	49	3
6 If line 1 is 45, multiply 1 x 4 x 5. If line 1 is 0, multiply 2 x 3 x 4 x 5			0	57,330	0
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} =	0.00		0.00

HRS - 0
PRO . □

02-8904-11-PA
REV. NO. 0

CONFIDENTIAL–NOT FOR PUBLIC RELEASE

Surface Water Route Work Sheet						
Rating Factor	**Assigned Value (Circle One)**	**Multi-plier**	**HRS**	**Max. Score**	**PRO**
1 Observed Release	$\boxed{0}$ 45	1		45	0
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					
Facility Slope and Intervening Terrain	$\boxed{0}$ 1 2 3	1		3	0
1-yr. 24-hr. Rainfall	0 1 $\boxed{2}$ 3	1		3	2
Distance to Nearest Surface Water	0 $\boxed{1}$ 2 3	2		6	2
Physical State	0 1 2 $\boxed{3}$	1		3	3
Total Route Characteristics Score				15	7
3 Containment	$\boxed{0}$ 1 2 3	1		3	0
4 Waste Characteristics					
Toxicity/Persistence	0 3 6 9 12 15 $\boxed{18}$	1		18	18
Hazardous Waste Quantity	0 $\boxed{1}$ 2 3 4 5 6 7 8	1		8	1
Total Waste Characteristics Score				26	19
5 Targets					
Surface Water Use	0 1 $\boxed{2}$ 3	3		9	6
Distance to a Sensitive Environment	0 $\boxed{1}$ 2 3	2		6	2
Population Served/Distance to Water Intake Downstream	$\boxed{0}$ 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1		40	0
Total Targets Score				55	8
6 If line 1 is 45, multiply 1 x 4 x 5. If line 1 is 0, multiply 2 x 3 x 4 x 5				64,350	0
7 Divide line 6 by 64,350 and multiply by 100	S_{sw} = *		0.00		0.00

* HRS score is zero because there are no apparent migration pathways